STOPPING WATER POLLUTION AT ITS SOURCE

MISA

Municipal/Industrial Strategy for Abatement

THIRTY SEVEN MUNICIPAL WATER POLLUTION CONTROL PLANTS

PILOT MONITORING STUDY

VOLUME I

INTERIM REPORT

DECEMBER 1988

Environment Ontario

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Minister

ISBN 0-7729-4900-X

THIRTY SEVEN
MUNICIPAL WATER POLLUTION CONTROL PLANTS

Pilot Monitoring Study

Volume I
Interim Report

Prepared for:
Ontario Ministry of the Environment
Water Resources Branch

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December 1988

c Queen's Printer for Ontario, 1988

EXECUTIVE SUMMARY

The Ontario Ministry of the Environment's Municipal Industrial Strategy for Abatement (MISA) Program is aimed at reducing contaminant loadings from direct industrial discharges and from municipal water pollution control plants (WPCPs). The MOE will address the municipal sector by the implementation of a Monitoring Regulation, requiring all Ontario WPCPs to monitor hazardous contaminants (HCs) in effluents and sludges. Subsequently, maximum concentration requirements of HCs in effluents and sludges will be established and a Compliance Regulation will be implemented.

The MOE, Environment Canada and the Municipal Engineers Association (MEA) sponsored this study to provide the information needed to support the development of a cost-effective and practical Monitoring Regulation.

This report is an interim report, summarizing study methodologies and presenting preliminary study findings. A more detailed analysis of the study data to determine factors affecting removal of HCs, and to allow prioritization of effluents and sludges and estimation of HC Loadings from study WPCPs will be presented in the final report.

Thirty-seven Ontario WPCPs were selected for the Pilot Monitoring Study, including 28 secondary treatment plants, 7 primary treatment plants and 2 lagoons. The field monitoring program involved sampling of influent, final effluent and raw and treated sludges for one to two 5 consecutive day periods at each of the study plants. In addition, plant performance parameters were monitored for the 2 weeks prior to sampling and during the sampling period.

Each sample was analyzed for all of the contaminants on a list established by MOE for this study. The monitoring list included 144 organic contaminants, 15 metals and conventional contaminants. Three laboratories contracted by the MOE, and the MOE Laboratory Services Branch (LSB), performed all of the analytical work.

A thorough field QA/QC program involved appropriate cleanliness and sample preservation procedures, duplicate sample collection of all field samples and field blank collection and analyses. Also, a comprehensive laboratory QA/QC program was carried out so that the applicability of each analytical result could be defined. This program involved analysis of method blanks, duplicate samples, field samples spiked with surrogate compounds and distilled water samples spiked with native compounds.

The individual plant data, including background information and analytical results from the sampling program were compiled and are presented in Appendix A (Volume II) of this report.

The analytical results from the sampling program were summarized for all of the plants for each type of sample. Metals were the most prevalently (most WPCPs) and most frequently detected contaminants in all sample types. Only 5 base neutral and acid extractable compounds were ever detected at more than 20 percent of plants for any sample type. Dioxin/furan compounds were detected at a maximum of 27 percent of plants in samples of raw sewage or final effluents (primary, secondary or lagoon) compared to 65 percent of plants for sludges. Approximately the same number (27 to 30) of pesticide/herbicide compounds were detected in raw sewage, secondary effluent and raw and treated sludge samples. The maximum frequency of detection and plant prevalency of pesticide/herbicide compounds was quite large and reasonably uniform for all sample types. The largest number of volatile organic compounds were detected in raw sewage and secondary effluent streams. The maximum frequency of detection of volatile organics compounds ranged from 15 to 55 percent, and the maximum plant prevalency ranged from 32 to 85 percent.

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1.0 INTRODUCTION AND PROJECT OBJECTIVES

1.1 Background

The Ontario Government's White Paper entitled, "Municipal-Industrial Strategy for Abatement (MISA)", released in June of 1986 by the Ontario Ministry of the Environment (MOE), outlined a new program to reduce the flow of toxic chemicals to the Province's receiving waters. MISA is aimed at reducing contaminant loadings from direct industrial discharges and from municipal water pollution control plants (WPCPs).

The program for municipal WPCPs will involve two stages. In the first stage, a Monitoring Regulation will be promulgated, requiring all WPCPs in Ontario to monitor HCs in effluents and sludges. In the second stage, maximum concentration requirements of HCs in effluents and sludges will be established and Compliance Regulations will be implemented.

In order that MOE can proceed with the establishment of the Monitoring Regulations, there is a need to determine the nature and incidence of HCs in WPCP effluents and sludges, to examine factors affecting the removal of HCs in wastewater treatment facilities and to evaluate the impact of upstream sanitary sewer users upon the HCs observed in WPCP effluents and sludges.

This study was jointly sponsored by the MOE, Environment Canada and the Municipal Engineers Association (MEA) with a goal of providing the information needed to support the development of a cost-effective and practical Monitoring Regulation.

The following is an interim report summarizing the study methodology used in the 37 WPCP study and presenting preliminary study findings. A more detailed analysis of the study data to determine factors affecting removal of HCs, and to allow prioritization of HCs in effluents and sludges and estimation of HC loadings from the study WPCPs will be presented in the final report.

The report has been organized into two volumes. Volume I has the following contents:

Section 2.0 - Field Program Methodology

This section presents a detailed description of the field program methodology.

Section 3.0 - Analytical Methodology

This section presents details of analytical methods as well as indicating the laboratories participating in the study.

Section 4.0 - WPCP Characteristics

This section outlines the characteristics of all WPCPs in Ontario and compares their characteristics with the 37 WPCPs studied.

Section 5.0 - Results and Analysis

This section presents in summary the preliminary results of the monitoring program.

Volume II of the preliminary report is comprised of individual appendices presenting design, operating and other background data for each WPCP as well as a complete summary of the preliminary results of monitoring.

1.2 Study Objectives

The goal of the Municipal WPCP Pilot Program was to obtain the information necessary to support the development of cost-effective and practical Monitoring Regulation for the municipal sector.

Specific project objectives included:

1. To carry out a well designed and rigorously controlled program of hazardous contaminant sampling of sludge and sewage streams at 37 Ontario WPCPs.

2. To summarize all study findings into a comprehensive project report and to provide a well organized database of HC and other results as well as process and flow measurements in a suitable electronic format.

3. To develop a prioritized list of contaminants observed in the study.

4. To assess the effectiveness of WPCPs in removing HCs and to identify (insofar as possible) the factors influencing removal efficiencies including any 'key' variables that may be employed as indicators of HC removal effectiveness.

5. To estimate the loadings discharged in the sludge and liquid effluents of the study WPCPs.

6. To assess the impact of industrial, residential and commercial sanitary sewer inputs upon the nature and loadings of HCs observed in the raw wastewaters, and sludges.

7. To identify and review major concerns affecting the implementation of the monitoring regulation and to make recommendations as needed to address any anticipated implementation problem areas.

1.3 Scope

The field monitoring program involved sampling of influent, final effluent and raw and treated sludges for one to two 5 consecutive day periods at each of the 37 study plants. Each sample was analyzed for all of the contaminants on a list established by MOE for this study. The monitoring list included 144 organic contaminants, 15 metals and conventional contaminants. A comprehensive QA/QC program was carried out in order to be able to define the applicability of the analytical results.

Three laboratories contracted by MOE (Zenon Environmental Ltd., Mann Testing Ltd. and Enviroclean Ltd.) and MOE Laboratory Services Branch (LSB) carried out all of the analytical work, under the direction of MOE.

The Project Liaison Committee directed the field program and defined the requirements for subsequent analytical data summarization, analysis and report writing.

2.0 FIELD PROGRAM METHODOLOGY

2.1 Selection of WPCPs

The WPCPs for the study were selected by MOE on the basis of the following criteria:

No.	Criteria
1.	All WPCPs which discharged more than 45,000 m^3/day effluent in 1986, regardless of treatment type. There were 16 secondary treatment plants and 7 primary treatment plants that fit this criterion. These WPCPs contributed 69.1 percent of the total flows discharged by the 406 plants in Ontario in 1986.
2.	Secondary WPCPs that were previously monitored by the Upper Great Lakes Connecting Channels (UGLCC) study in the summer of 1986. Eleven plants were monitored by UGLCC(Ref.1). Three of the 11 plants were already selected under Criterion 1. Consequently, only 5 additional secondary plants with an average daily flow in 1986 of less than 45,000 m^3/day were selected under Criterion 2 alone. Three plants (Chatham secondary WPCP, Amhurstburg and Point Edward, primary WPCPs) were not remonitored in this study.
3.	Small secondary treatment plants with flows less than 20,000 m^3/d which produced effluent quality typical of the effluent quality achieved in Ontario by well-operated secondary WPCPs were also selected. "Typical" effluent quality was defined as effluent BOD and TSS concentrations between 8 and 15 mg/L, and total phosphorus (TP) concentrations between 0.7 and 1.0 mg/L. Plant location was also considered in plant selection. It was more desirable in terms of economics and logistics, to sample at WPCPs that were in proximity to those selected in Criteria 1 and 2. Seven plants were selected under Criterion 3.
4.	Two lagoons were also selected for monitoring. Lindsay is served by the largest lagoon in Ontario. Niagara-on-the-Lake has a medium sized lagoon treatment facility.

In total, 37 WPCPs were selected by the above criteria. Table 2-1 presents a list of these plants indicating the criteria under which they were selected. Figure 2-1 presents a map showing the location of each WPCP.

Table 2-1
ONTARIO WPCPs SELECTED FOR THE MONITORING PROGRAM

Criteria	WPCP	Treatment Type
1. 1986 Average Daily Flow >45,000 m^3/d	Brantford	Secondary
	Burlington (Skyway)	Secondary
	Cornwall	Primary
	Guelph	Secondary - Tertiary
	Hamilton	Secondary
	Kingston City	Primary
	Kitchener	Secondary
	London (Greenway)	Secondary
	Mississauga (Clarkson)	Secondary
	Mississauga (Lakeview)	Secondary
	Niagara Falls (Stamford)	Secondary
	Ottawa (Green Cr.)	Primary
	Pickering (Duffin Cr.)	Secondary
	Peterborough	Secondary
	Sarnia	Primary
	Sault Ste.Marie (East)	Primary
	Sudbury	Secondary
	Thunder Bay	Primary
	Toronto (Highland Cr.)	Secondary
	Toronto (Humber)	Secondary
	Toronto (Main)	Secondary
	Waterloo	Secondary
	Windsor (Westerly)	Primary
2. UGLCC and 1986 Average Daily Flow <45,000 m^3/d	Belle River (Maidstone)	Secondary
	Moore (Corunna)	Secondary
	Sault Ste.Marie (West)	Secondary
	Wallaceburg	Secondary
	Windsor (Little River)	Secondary
3. Small Secondary WPCPs 1986 Average Daily Flow <20,000 m^3/d	Grimsby (Baker Road)	Secondary
	Kingston Township	Secondary
	London (Pottersburg)	Secondary
	Oakville (South East)	Secondary
	Paris	Secondary
	Toronto (North)	Secondary
	Whitby (Pringle Creek 1)	Secondary
4. Lagoons	Lindsay	Lagoon
	Niagara-on-the-Lake	Lagoon

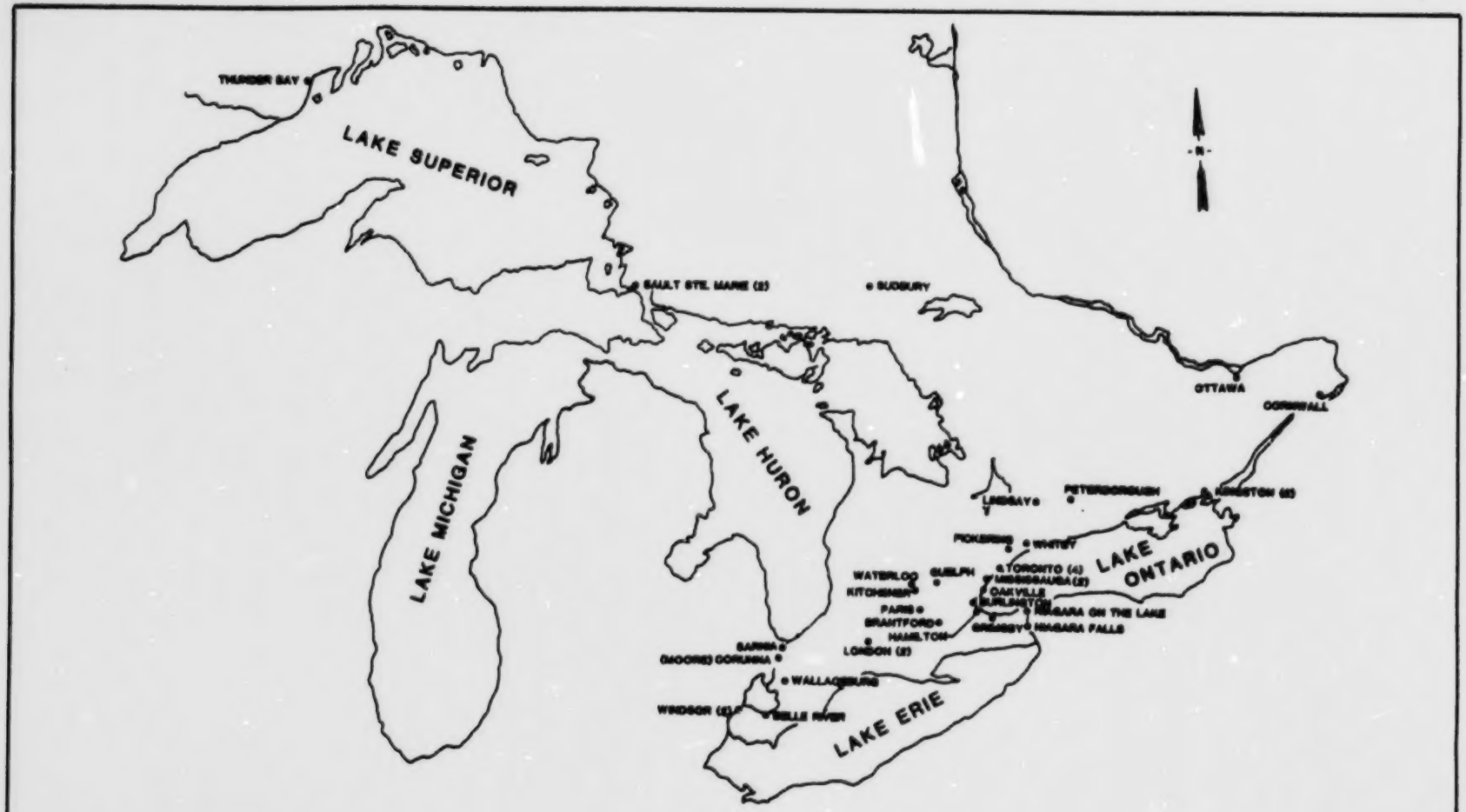

Figure 2-1

GEOGRAPHIC LOCATIONS OF PLANTS INCLUDED IN THE 37 WPCP STUDY

CANVIRO

2.2 Selection of Target Compounds

The listing of target monitoring parameters for the entirety of the MISA program is presently embodied in the Environmental Monitoring Priority Pollutant List (EMPPL) (Ref. 2). At the time the 37 WPCP study was initiated the EMPPL listing was not as yet formulated and consequently an alternative but nonetheless comprehensive listing of contaminants was identified.

The organic contaminant list used in the present study includes all of the 126 organic contaminants monitored in the U.S. Environmental Protection Agency's (USEPA) Priority Pollutant List (PPL), established in 1972 (Ref. 3). The list also includes additional chlorinated pesticides, nitrogen phosphorus herbicides and phenoxy acid herbicides.

The organic contaminants that were monitored are presented in Table 2-2(a). The list includes 42 volatile organic compounds, 57 base neutral and acid extractable compounds, 35 pesticides and herbicides, and 10 dioxin furans (PCDD/PCDF) compounds. In total there were 144 organic contaminants monitored.

Fifteen metals were also monitored during the study, which are listed in Table 2-2(b). This list includes all of the metals presently regulated in Ontario in sludges utilized on agricultural land. A number of conventional contaminants, cyanide and total phenolics were monitored during the study. These contaminants were selected as general plant performance indicators. The list of conventional contaminants is presented in Table 2-2(c).

Table 2-3 presents those HCs included on the EMPPL but not monitored in this study. This list consists of 80 contaminants.

The organic contaminant list selected for this study is the same as the one used for monitoring by the City of Metropolitan Toronto at their 4 WPCPs in 1984, 1985 and 1986. This list was chosen because the MOE were confident that these contaminants can be satisfactorily monitored and that a long-term data base would be available for the 4 Toronto plants.

2.3 Monitoring Program

The sampling program at the 37 selected plants began in January 1987 and was completed in July 1987. In general, each monitoring period involved 2 weeks of pre-monitoring of plant performance and 5 days of sampling. Seventeen plants were monitored for two periods and 20 were monitored for one period only.

Table 2-2(a)
ORGANIC CONTAMINANTS MONITORED IN THE STUDY

Base Neutral and Acid Extractable Compounds	Dioxins/Furans	Pesticides and Herbicides	Volatile Organic Compounds
2,4,5-Trichlorophenol	Tetrachlorodibenzodioxins	Toxaphene*	1,1,1-Trichloroethane*
2,4,6-Trichlorophenol	Tetrachlorodibenzofurans	Total PCB	1,1,2,2-Tetrachloroethane
2,4-Dichlorophenol	Pentachlorodibenzodioxins	Strobane*	1,1,2-Trichloroethane
2,4-Dimethyl phenol	Pentachlorodibenzofurans	Silvex*	1,1-Dichloroethene
2,4-Dinitrotoluene	Hexachlorodibenzodioxins	PP-DDT*	1,2-Dichlorobenzene
2,4-Dinitro-o-cresol	Hexachlorodibenzafurans	PP-DDE*	1,2-Dichloroethane
2,6-Dinitrotoluene	Heptachlorodibenzodioxins	PP-DDD*	1,2-Dichloropropane
2 Hydroxy-toluene (O-Cresol)	Heptachlorodibenzofurans	Photomirex*	1,3-Dichlorobenzene
2-Chloronaphthalene	Octachlorodibenzodioxin	PCNB*	1,4-Dichlorobenzene
2-Chlorophenol	Octachlorodibenzofuran	Oxychlordane*	1-Octene*
2-Nitrophenol*		Mirex*	2-Chloroethylvinyl ether*
3 Hydroxy-toluene (m-Cresol)		Methoxychlor*	3-Chloro-1-propene*
4 Hydroxy-toluene (P-Cresol)		Hexacloroethane	3-Chloro-toluene*
4-Bromophenyl phenyl ether		Hexachlorocyclopentadiene	Acrolein
4-Chlorophenyl phenyl ether		Hexachlorobutadiene	Acrylonitrile
9H Fluorene		Heptachlor Epoxide*	Benzene
Acenapthene		Heptachlor*	Bromodichlorobenzene*
Acenapthylene		HCB	Bromodichloromethane
Alpha-naphthylamine*		Gamma-Chlordane*	Bromoethane
Ametryn* (PH)		Gamma-BHC8	Bromoform
Anthracene		Eldrin Aldehyde*	Carbon tetrachloride
Atrazine* (PH)		Eldrin*	Chlorobenzene
Benzo (A) anthracene		Endosulfan Sulphate*	Chloroethane*
Benzo (A) pyrene		Dieldrin*	Chloroform
Benzo (B) fluoranthene		Delta-BHC*	Chloromethane
Benzo (K) fluoranthene		Captan*	cis-1,3-Dichloropropene
Beta-napthylamine*		Beta-Endosulfan*	cis-1,2-Dichloroethylene*
Biphenyl		Beta-BHC*	Dibromochloromethane
bis(2-Chloro ethoxy) methane		Alpha-Endosulfan*	Dichlorodifluoromethane*
bis(2-Chloro ethyl) ether		Alpha-Chlordane*	Diethyl ether*
bis(2-Chloroispropyl) ether		Alpha-BHC*	Ethylbenzene
bis(2-ethyl hexyl) phthalate		Aldrin*	Hexane*
Butyl benzyl phthalate		2,4-Dichlorophenoxyacetic acid (2,4-D)*	Hexanol*
Chrysene		2,4-5Trichlorophenoxy-acetic acid (2,4,5-T)*	Methylene chloride
Diazinon* (PH)		1,2,4-Trichlorobenzene	Styrene
Dibenzo (AH) anthracene			Tetrachloroethene
Dicloran* (PH)			Toluene
Diethyl phthalate*			Trans-1,3-Dichloropropene
Dimethyl phthalate*			Trichloroethene
Dipbenyl ether			Trichloroflouromethane
Di-n-butyl phthalate			Vinyl bromide*
Di-n-octyl phthalate			Vinyl chloride
Fluoranthene			
Indeno (123-CD) pyrene			
Malathion* (PH)			
Naphthalene			
Nitrobenzene*			
N-Nitroso Dipbenylamine			
N-Nitroso-di-n-propyl-amine			
Parathion ethyl* (PH)			
Parathion methyl* (PH)			
Pentachlorophenol			
Phenanthrene			
Phenol			
Pyrene			
P-chloro-M-cresol*			
Tri-n-tolyl phosphate			

Notes:

* Contaminants not included in EMPPL (Ref. 2)
(PH) Pesticide/Herbicide compound grouped with Base neutral and acid extractable compounds for analyses

Table 2-2(b)
LIST OF METALS MONITORED IN THE STUDY

Priority Metals: (Regulated by MOE in sludge applied to agricultural land)	Arsenic	As
	Cadmium	Cd
	Chromium	Cr
	Cobalt	Co
	Copper	Cu
	Mercury	Mg
	Molybdenum	Mo
	Nickel	Ni
	Lead	Pb
	Selenium	Se
	Zinc	Zn
Other Metals:	Aluminum	Al
	Beryllium	Be
	Silver	Si
	Strontium	St

Table 2-2(c)
CONVENTIONAL CONTAMINANTS MONITORED IN THE STUDY

Raw Wastewater & Effluent Streams	Sludges
pH	pH
Biochemical Oxygen Demand (BOD_5)	Chemical Oxygen Demand (COD)
Chemical Oxygen Demand (COD)	Nitrites (NO_2)
Dissolved Organic Carbon (DOC)	Nitrates (NO_3)
Total Suspended Solids (TSS)	Ammonia (NH_3)
Total Volatile Suspended Solids (VSS)	
Filtered Nitrite (NO_2)	Total Kjeldhal Nitrogen (TKN)
Filtered Nitrates (NO_3)	Total Phosphorus (TP)
Filtered Ammonia (NH_3)	Total Solids (TS)
Total Kjeldhal Nitrogen (TKN)	Total Volatile Solids (VS)
Total Phosphorus (TP)	Total Phenolics (4AAP)
Turbidity	Cyanide
Total Phenolics (4AAP)	
Cyanide (Total)	

Table 2-3
EMPPL (Ref. 2) ORGANIC CONTAMINANTS NOT MONITORED
IN THE PRESENT STUDY

1,1,3,3-Tetrachloroacetone
1,1,3-Trichloroacetone
1,2,3,4-Tetrachlorobenzene
1,2,3,5-Tetrachlorobenzene
1,2,3-Trichlorobenzene
1,2,4,5-Tetrachlorobenzene
1,3-Butadiene
1,4-Dioxane
1-Chloronaphthalene
1-Methylnaphthalene
1-Nitronaphthalene
2,3,4,5-Tetrachlorophenol
2,3,4,6-Tetrachlorophenol
2,3,4-Trichlorophenol
2,3,5,6-Tetrachlorophenol
2,3,5-Trichlorophenol
2,3,7,8-Tetrachlorodibenzo-p-dioxin
2,4,5-Trichlorotoluene
2,6-Di-t-butyl-4-methylphenol
2-Hydroxybiphenyl
2-Methylnaphthalene
2-Nitroapththalene
3,3 Dichlorobenzidene
4,6-Dinitro-o-cresol
4-Aminoazobenzene
4-Chloro3-methylphenol
4-Hydroxybiphenyl
Abietic Acid
Acenaphthene, 5-nitro
Acridine
Aniline
Benzaldehyde
Benzeneacetonitrile
Benzidine
Benzyl alcohol
Bis(2-chloroethyl)ether
Bromomethane
Butanal
Camphene
Chlorodehydroabietic acid
Chromium (hexavalent)
Dehydroabietic acid
Dimethyl disulphide
Diphenylamine
Ethylene dibromide
Ethylene thiourea
Eugenol
Formaldehyde
Hydrazine
Hydroxycyclohexane (Cyclohexanol)
Indole
Isopimaric
Levopimaric acid
Limonene
Mercapto benzothiazole
Methyl ethyl ketone
Methyl styrene
Neoabietic acid
N-Methylformamide
N-Nitrosodimethylamine
Octachlorostyrene
Oil and grease
Oleic Acid
Pentachlorobenzene
Perylene
Pimaric acid
Specific conductance
Sulphide
Tetrachloroacetone
Tetrachlorogualocal
Tetraethyl lead
Tetra-alkyl lead (Total)
Thiourea
Total organic carbon (TOC)
Trichlorogualacol
Triethyl lead
Trimethylbenzenes (1,2,3 isomers)
Trimethylnaphthalene
Tri-alkyl lead (Total)
Tri-n-Butylphosphate

During the 5 day sampling period, 24-hour composite samples of raw sewage and final effluent (primary, secondary or lagoon) were collected daily. Also, 5-day composite samples of raw sludge and treated sludge were collected.

2.3.1 WPCP Sampling Schedule

The sampling schedule was organized into two separate survey programs. The "winter" program began on 19 January 1987 and continued until 30 March 1987, involving sampling at 25 WPCPs. The "summer" program occurred between 20 April 1987 and 26 July 1987 and included 29 WPCPs. Seventeen of the WPCPs were sampled in both programs, and the remaining 20 were sampled in only one program. Table 2-4 presents the plants sampled in each program.

It should be noted that the labels "winter" and "summer" were used throughout the study to describe the sampling schedules, however, did not necessarily imply a significant difference in weather temperature or operating conditions between the winter and summer programs.

The study requirements outlined that the monitoring of WPCPs take place during periods of "typical" operation. Operation was considered "typical" if the operating conditions were within a normal range expected for the particular plant. This encompassed a wide range of operational conditions, including minor process upsets and equipment malfunction.

Due to limited time and resources, it was not feasible to monitor plants during periods of exceptional circumstances. Therefore, plant monitoring during periods of process shut downs, process changeovers, large industrial spills and major upsets was avoided, where possible.

In general treatment plants were sampled for 5 consecutive days. Four plants were sampled for an extended 7 day period during the summer program. Specifically, they were: Kitchener WPCP, Ottawa (Green Creek) WPCP, Mississauga (Clarkson) WPCP and Toronto (Highland Creek) WPCP. Tables 2-5 and 2-6 respectively present the winter and summer sampling program schedules.

2.3.2 Pre-Monitoring Site Inspections

Prior to the monitoring at each of the 37 WPCPs in the present study, a senior CANVIRO engineer accompanied by a MOE staff member visited the site. The purposes of this initial visit were to define the sampling sites and to arrange for collection of design information, plant operating records and photographs of the site.

Table 2-4
WPCP SAMPLING PROGRAMS

Plant	Code	Winter	Summer
Belle River (Maidstone)	MA	X	
Brantford	BR	X	X
Burlington (Skyway)	BU	X	X
Cornwall	CO	X	X
Grimsby (Baker Rd.)	GR		X
Guelph	GU	X	X
Hamilton (Woodward)	HA	X	X
Kingston City	KC		X
Kingston Township	KT		X
Kitchener	KI	X	X
Lindsay	LI		X
London (Greenway)	LG	X	X
London (Pottersburg)	LP	X	X
Mississauga (Clarkson)	MC	X	X
Mississauga (Lakeview)	ML	X	X
Moore (Corunna)	CR	X	
Niagara Falls (Stamford)	NF	X	X
Niagara-on-the-Lake	NL		X
Oakville (SE)	OA		X
Paris	PA		X
Peterborough	PT	X	X
Pickering (Duffin Creek)	PD	X	X
Sarnia	SA	X	
Sudbury	SU		X
Sault Ste. Marie (East/Old)	SE	X	
Sault Ste. Marie (West/New)	SW	X	
Thunder Bay	TB		X
Toronto (Highland Creek)	TS	X	X
Toronto (Humber)	TH	X	X
Toronto (Main)	TM	X	X
Toronto (North)	TN		X
Wallaceburg	WA	X	
Waterloo	WT	X	X
Whitby (Pringle Creek #1)	WP		X
Windsor (Little River)	WL	X	
Windsor (Westerly)	WW	X	
Ottawa (Green Creek)	OT		X

Table 2-5
WINTER SAMPLING SCHEDULE

Plant	Sampling Dates
Kitchener	Jan 19 - Jan 23
Waterloo	Jan 19 - Jan 23
Burlington	Jan 19 - Jan 23
Toronto (Main)	Jan 26 - Jan 30
Mississauga (Clarkson)	Mar 2 - Mar 6
Mississauga (Lakeview)	Mar 2 - Mar 6
Toronto (Humber)	Feb 9 - Feb 13
London (Greenway)	Feb 16 - Feb 20
London (Pottersburg)	Feb 16 - Feb 20
Windsor (Little River)	Feb 16 - Feb 20
Windsor (Westerly)	Feb 16 - Feb 20
Hamilton (Woodward)	Feb 23 - Feb 27
Toronto (Highland Creek)	Mar 16 - Mar 20
Sault Ste. Marie (West)	Mar 16 - Mar 20
Sault Ste. Marie (East)	Mar 16 - Mar 20
Peterborough	Mar 9 - Mar 13
Sarnia	Feb 2 - Feb 6
Moore (Corunna)	Feb 2 - Feb 6
Wallaceburg	Feb 2 - Feb 6
Belle River (Maidstone)	Feb 2 - Feb 6
Brantford	Mar 9 - Mar 13
Pickering (Duffin Creek)	Mar 30 - Feb 3
Cornwall	Mar 30 - Feb 3
Guelph	Mar 27 - Mar 27
Niagara Falls (Stamford)	Mar 23 - Mar 27

Table 2-6
SUMMER SAMPLING SCHEDULE

Plant	Sampling Dates
Peterborough	Apr 20 - Apr 24
Lindsay	Apr 20 - Apr 24
Grimsby (Baker Rd.)	Apr 20 - Apr 24
Cornwall	May 4 - May 8
Guelph	May 4 - May 8
Paris	May 11 - May 15
Sudbury	May 11 - May 15
Pickering (Duffin Creek)	May 18 - May 22
Kingston City	May 18 - May 22
Kingston Township	May 18 - May 22
Whitby (Pringle Creek #1)	May 18 - May 22
Niagara Falls (Stamford)	May 25 - May 29
Niagara-on-the-Lake	May 25 - May 29
Thunder Bay	Jun 1 - Jun 5
Toronto (North)	Jun 8 - Jun 12
Oakville (SE)	Jun 8 - Jun 12
Toronto (Main)	Jun 15 - Jun 19
Mississauga (Clarkson)*	Jun 22 - Jun 26
Burlington (Skyway)	Jun 22 - Jun 26
Toronto (Highland Creek)*	Jun 29 - Jul 5
Hamilton (Woodward)	Jun 29 - Jul 3
London (Greenway)	Jul 6 - Jul 10
London (Pottersburg)	Jul 6 - Jul 10
Brantford	Jul 6 - Jul 10
Mississauga (Lakeview)	Jul 13 - Jul 17
Waterloo	Jul 20 - Jul 24
Ottawa (Green Creek)*	Jul 20 - Jul 26
Toronto (Humber)	Jul 20 - Jul 24
Kitchener*	Jul 20 - Jul 26

* Plants sampled for 7 days

The evaluation of the sampling site involved the selection of suitable locations for the sampling equipment and identification and resolution of sampling difficulties. The plant flow monitoring equipment (sewage and sludge meters) were reviewed to assess the equipment accuracy and the ability to flow proportion samples. In addition, the monitoring program was discussed with the plant staff for the purpose of locating field team equipment (refrigerators, monitoring equipment, etc.) and to ensure a full understanding of project requirements.

During the initial visit, arrangements were made to obtain historical performance data for each plant, plant operating record sheets, and plant design reports.

2.3.3 Background Monitoring

In order to ensure that the HC data obtained at the plants would be collected under conditions that were representative of typical plant operation, a two-week presampling process monitoring period was established. After the initial site visit, any limitations in the routine monitoring program were identified. Supplemental monitoring requirements were then determined for any additional process information for the two weeks prior to the sampling period.

In order to define plant performance during the premonitoring period, data was collected for influent and effluent conventional contaminants (BOD_5, TSS, TP, TKN, NH_3-N). At some plants, these parameters were not routinely monitored. It was therefore arranged that a sample be collected by WPCP staff at least once per week and submitted to MOE for analysis.

All of the available performance monitoring information was summarized on a spreadsheet. Figure 2-2 presents an example spreadsheet and shows monitored and derived data.

In certain instances, additional data not routinely collected was obtained by plant staff during the pre-monitoring and sampling period. This information included waste sludge rates, phosphorus removal chemical dosage, raw sludge volumes, digested sludge volumes, etc. The operation of the plant was evaluated for the study period based on discussions with plant operating staff, the background data and all pre-monitoring data.

2.3.4 Sampling Methodologies

2.3.4.1 Sampling Locations

Table 2-7 presents a summary of the sampling locations at each plant.

Figure 2-2
EXAMPLE OPERATIONAL EVALUATION SPREADSHEET

OPERATIONAL EVALUATION FOR: "EXAMPLE" WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: Feb. 20, 1987
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: 36,320 m3/d

	PRE-SAMPLING PERIOD							PRE-SAMPLING PERIOD							SAMPLING PERIOD						
PARAMETER	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7	DAY 8	DAY 9	DAY 10	DAY 11	DAY 12	DAY 13	DAY 14	DAY 15	DAY 16	DAY 17	DAY 18	DAY 19	DAY 20	DAY 21
RAW SEWAGE FLOW	43,500	40,800	36,300	35,400	35,800	39,000	41,760	34,000	34,900	34,000	34,000	41,700	31,300	27,600	27,600	28,100	28,100	29,500	29,900		
% of Design Flow	119.77%	112.33%	99.94%	97.47%	98.57%	107.38%	114.81%	93.61%	96.09%	93.61%	93.61%	114.81%	86.18%	75.99%	75.99%	77.37%	77.37%	81.22%	79.85%		
Influent BOD (mg/L)	171.0	210.0	164.0	149.0	113.0	124.0	140.0	145.0	148.0	107.0	172.0	226.0	230.0	145.0	173.0	159.0	125.0	219.0	167.0		
Primary BOD (mg/L)																					
Secondary BOD (mg/L)	8.0	5.0	5.0	11.0	4.0	3.0	3.0	7.0	6.0	4.0	5.0	5.0	4.0	21.0	27.0	27.0	27.0	3.0	28.0		
% PRIMARY REMOVAL																					
% SECONDARY REMOVAL	95.3	97.6	97.0	92.6	96.5	97.6	97.9	95.2	95.9	96.3	96.3	97.8	98.3	85.5	84.4	83.0	78.4	98.6	73.8		
Influent SS (mg/L)	244.0	296.0	192.0	192.0	151.0	156.0	182.0	171.0	174.0	128.0	172.0	228.0	216.0	214.0	135.0	140.0	124.0	217.0	186.0		
Primary SS (mg/L)																					
Secondary SS (mg/L)	11.0	7.0	8.0	13.0	11.0	7.0	8.0	16.0	12.0	11.0	8.0	14.0	7.0	16.0	6.0	8.0	9.0	16.0	9.0		
% PRIMARY REMOVAL																					
% SECONDARY REMOVAL	95.5	97.6	95.8	93.2	92.7	95.3	95.6	90.6	93.1	91.4	95.3	93.9	96.8	92.5	95.6	94.3	92.7	92.6	91.5		
Influent NH4 (mg/L)	14.2	12.8					5.6	6.8	6.8						15.7	18.5					
Primary NH4 (mg/L)																					
Secondary NH4 (mg/L)	1.0	0.6					1.3	0.8	1.4						2.7	2.0					
% PRIMARY REMOVAL																					
% SECONDARY REMOVAL	93.2	95.3					75.9	88.4	79.4						82.8	89.2					
Influent TKN (mg/L)	25.3	23.2					14.0	11.7	12.2						27.6	32.6					
Primary TKN (mg/L)																					
Secondary TKN (mg/L)	2.4	2.4					1.3	2.6	1.7						9.0	14.3					
% PRIMARY REMOVAL																					
% SECONDARY REMOVAL	90.5	89.7					90.7	77.8	86.1						67.4	56.1					
Influent Total P (mg/L)	6.90	6.20	4.60	5.10	4.60	4.00	3.70	4.60	5.00	4.30	5.50	8.00	8.50	5.10	7.40	6.20	5.20	7.20	6.40		
Primary Total P (mg/L)																					
Secondary Total P (mg/L)	0.50	0.19	0.34	0.42	0.46	0.30	0.32	1.50	0.38	0.46	0.34	0.64	0.51	1.10	0.80	0.99	0.37	0.35	0.45		
% PRIMARY REMOVAL																					
% SECONDARY REMOVAL	92.8	96.9	92.6	91.8	90.0	92.5	91.4	67.4	92.4	89.3	93.8	92.0	94.0	78.4	89.2	84.0	92.9	95.1	93.0		

Table 2-7
SUMMARY OF SAMPLING LOCATIONS AT THE STUDY WPCP's

Plant	Number of Sampling Locations						
	Raw Sewage	Primary Effluent	Secondary Effluent	Tertiary Effluent	Raw Sludge	Waste (Treated) Sludge	Recycle to Raw Sewage Stream
Tertiary							
Guelph	1	-	1	1	1	AND/DW-1	-
Secondary							
Belle River (Maidstone)	1	-	1	-	1	AD-1	-
Brantford	1	-	1	-	2	AND-1	-
Burlington (Skyway)	1	-	1	-	1	AND-1	-
Grimsby (Baker Road)	1	-	1	-	1	AND-1	-
Hamilton	1	-	1	-	1	AND/DW-1	1
Kingston TWP	1	-	1	-	1	AND-1	1
Kitchener	1	-	1	-	1	AND-1	-
London (Greenway)	1	-	1	-	WAS-1/PRIM-1	DW-1	-
London (Pottersburg)	1	-	1	-	1	-	-
Mississauga (Clarkson)	1	-	1	-	2	COTH/AND-1	-
Mississauga (Lakeview)	2	-	3	-	1	DW/BL/TC-1	-
							-
Moore (Corunna)	1	-	1	-	1(RAS)	HT-1	-
Niagara Falls (Stamford)	1	-	1	-	1(PRIM)1(RBC)	AND-1	-
Oakville (SE)	1	-	1	-	1	AND-1	-
Paris	1	-	1	-	1	AD/TH/HT-1	-
Peterborough	1	-	1	-	1	AND-1	-
Pickering (Duffin Creek)	1	-	1	-	1	AND/DW-1	-
Sault Ste. Marie (West)	1	-	1	-	1	HT/DW-1	1

Notes:
AND - Anaerobically Digested
AD - Aerobically Digested
DW - Dewatered
INC - Incinerated
COTH - Co-thickened in Primary Clarifiers
HT - Heat Treated
THO - Thermally Oxidated
WAS - Waste Activated Sludge - no treatment
TC - Thermally Conditioned
TH - Thickened
HT - Holding Tank - Supernatant Decanted
GR - Ground
RAS - Return Activated Sludge
PRIM - Primary Sludge
RBC - Rotating Biological Contacter Sludge
HEAT - Heat Treatment

(KIR18/282W)

Table 2-7
Continued

Plant	Number of Sampling Locations						
	Raw Sewage	Primary Effluent	Secondary Effluent	Tertiary Effluent	Raw Sludge	Waste (Treated) Sludge	Recycle to Raw Sewage Stream
Sudbury	1	-	1	-	-	HT-1	-
Toronto (Highland Creek)	1	-	1	-	1	COTH/AND/GR/HEAT/DW-1	-
Toronto (Humber)	1	-	1	-	PRIM-1/TH-1	TH/AND-1	2
Toronto (Main)	3	-	1	-	PRIM-1/TH-1	TH/AND/THO/DW-1	
Toronto (North)	1	-	1	-	1	AND/DW-1	-
Waterloo	1	-	2	-	2	AND-2	-
Wallaceburg	1	-	1	-	1	AND/DW-1	-
Whitby (Pringle Cr #1)	2	-	1	-	1	AND-1	1
Windsor (Little River)	1	-	1	-	1	DW-1	1
Primary							
Cornwall	1	1	-	-	1	AND/DW-1	-
Kingston (City)	1	1	-	-	1	AND-1	-
Ottawa (Green Ck)	1	1	-	-	1	AND-1	2
Sarnia	1	1	-	-	1	AND-1	1
Sault Ste. Marie (East)	2	1	-	-	1	-	-
Thunder Bay	1	1	-	-	2	AND-1	-
Windsor (Westerly)	1	1	-	-	1	DW-1	1
Lagoon							
Lindsay	1	2	-	-	-	-	-
Niagara-on-the-Lake	1	1	-	-	-	-	-

Notes:

AND - Anaerobically Digested
AD - Aerobically Digested
DW - Dewatered
INC - Incinerated
COTH - Co-thickened in Primary Clarifiers
HT - Heat Treated
THO - Thermally Oxidated
WAS - Waste Activated Sludge - no treatment
TC - Thermally Conditioned
TH - Thickened
HT - Holding Tank - Supernatant Decanted
GR - Ground
RAS - Return Activated Sludge
PRIM - Primary Sludge
RBC - Rotating Biological Contacter Sludge
HEAT - Heat Treatment

(KIR18/282W)

In general, raw sewage was sampled at a point at, or past, the grit removal area which provided good mixing characteristics. If there was aeration at the grit removal area, samples for volatile organic compounds only were collected upstream of this point.

At nine plants it was not possible to obtain a raw sewage sample at a point in the plant before an internal recycle (eg. digester supernatant, waste activated sludge etc.) entered the stream. In these cases, it was also necessary to collect a recycle stream sample so that the recycle contribution to the combined stream in terms of flows and contaminants, could be subtracted to obtain the actual raw wastewater characteristics.

Final effluent streams at all WPCPs except Mississauga (Lakeview) were sampled at a point beyond the point of chlorine addition. Due to logistics, at Lakeview, the effluent sample was taken prior to chlorination and manually chlorinated by the sampling team (subsection 2.3.4.3).

Sampling of raw sludges took place at one or more locations at each plant, depending on the configuration. Samples were only taken during operation of the sludge pumps. Typically, the treatment plants had multiple sumps from where raw sludge could be drawn. In the more complex cases, it was not practical to sample all of the locations each day. In these cases, a sample routine was determined which would allow all locations to be sampled on a regular basis over the 5 day study period. If waste activated sludge was sampled as a separate component of the raw sludge sample it was aliquoted on a flow weighted basis.

Treated sludges were either digested or digested and dewatered. For digested sludges, samples were taken from each digester in service and composited into one treated sludge sample. In plants with dewatering operations, the sludge cake was sampled.

2.3.4.2 Sample Collection Procedures

Raw sewage, final effluent (primary, secondary, lagoon and tertiary) and recycle streams were collected using the following methods:

Sampling Method	Analyses
24-hour flow proportioned composites	Conventionals, metals, cyanide, base-neutral and acid extractable compounds and pesticides and herbicides
5-day composite samples	Dioxin-furan compounds
Grab samples (3 per 24 hours)	Volatile organic compounds

The 24-hour flow proportioned composite samples were collected using one of three techniques, depending on the logistics of the sampling point. These included:

- Automatic samplers withdrew one individual aliquot each hour. All of the aliquots were manually composited on a flow-proportioned basis at the end of each 24-hour period.

- Automatic samplers were interfaced with the plant flow recorders so that flow weighted hourly aliquot volumes were added directly into one composite container.

- Hourly aliquots were grab sampled and composited manually on a flow proportioned basis at the end of each 24-hour period.

For dioxin/furan analyses, flow proportioned aliquots were collected 3 times each day at least 2 hours apart and combined to form 5 day composite samples. Each aliquot was poured directly into the 5-day composite container.

Grab samples for volatile organic compound analyses were collected 3 times per day at least 2 hours apart. The equal volume samples were combined into daily composite samples at the analytical laboratory.

Raw and treated sludge samples collected for all analyses were 5-day flow proportioned composite samples. A minimum of three grab aliquots were collected each day, at least 2 hours apart. There were two methods of making up sludge samples as follows:

- Individual aliquots were stored separately and combined flow proportionally at the end of the 5-day period to form one 5-day composite sample.

- Individual flow proportioned aliquots were added directly to the 5-day composite container. This method was only used if the sludge flow was reasonably constant from day to day.

2.3.4.3 Sampling Handling Procotol

In order to ensure the integrity of sample results, a number of cleanliness, security and preservation procedures were carried out in the field.

All of the field equipment coming into contact with the sample was washed with methanol and rinsed with organic free distilled water prior to sampling. When sampling liquid streams, the equipment was also pre-rinsed with the stream

before the sample was taken. Equipment material was either glass, stainless steel, tetlon or surgical graded silicon rubber. All equipment was site specific.

For security against breakages in transport or at the laboratory, all samples were collected in duplicate.

Tables 2-8 and 2-9 present the preservation methods used for liquid and sludge samples respectively. In addition to bottle specific preservation methods dependent on the nature of the analyses, all bottles were stored at 4°C in the field and during transport.

Table 2-8
INFLUENT, EFFLUENT AND RECYCLE SAMPLE PRESERVATION

Sample Group	Analysis	# of Samples	Bottle(2)	Preservation(1)
24 hr composite (Automatic or manual)	Base Neutral and Acid Extractable	2/day	1L (3P)	4°C
	Pesticides/Herbicides	2/day	1L (3P)	4°C
	ICAP	2/day	500 mL (20)	HNO_3 + 4°C
	Mercury	2/day	250 mL (8c)	HNO_3 + K_2CrO_7 + 4°C
	Conventionals	2/day	1 L (3)	4°C
	Phenolics	2/day	250 mL (8p)	$CuSO_4$ + H_2PO_4 + 4°C
	Cyanide	2/day	500 mL (20)	NaOH + 4°C
5 day composite	Dioxins/Furans	2/wk	1L (3p)	4°C
Grabs	Volatile Organics	6/day	50 mL vials	4°C

Notes: (1) Sodium Thiosulphate was added to all effluent samples
(2) MOE bottle description code

Table 2-9
SLUDGE SAMPLE COLLECTION AND PREPARATION

Sample Type	Analysis	# of Samples	Bottle*	Preservation
Sludges (Raw & Treated)	Volatile Organics	2/wk	250 mL (5p)	Methanol 4°C
	Base Neutral & Acid Extractable	2/wk	250 mL (5p)	4°C
	Pesticides & Herbicides	2/wk	250 mL (5p)	4°C
	Dioxins/Furans	2/wk	250 mL (20)	4°C
	ICAP, Mercury, Cyanide	2/wk	500 mL (20)	4°C
	Conventionals	2/wk	250 mL (5)	4°C
	Phenolics	2/wk	250 mL (5)	4°C

* - MOE Bottle Description Code

In addition to the above procedures, sodium thiosulphate ($Na_2S_2O_3$) was added to all final effluent samples to neutralize the chlorine residual. The sodium thiosulphate was added to final effluent sample containers prior to sampling each day.

At one plant (Mississauga (Lakeview)), it was not possible to obtain a chlorinated effluent sample, and non-chlorinated effluent was sampled. In this particular case, the sample was dosed with a concentrated sodium hypochlorite solution to provide a chlorine concentration in the sample equal to the concentration in the chlorinated plant effluent, and mixed slowly for a time equal to the contact time at the plant. The sample was subsequently neutralized with sodium thiosulphate.

2.3.5 Documentation of Field Program

Field sampling personnel were responsible for maintaining two types of records:

- Process information
- Sample submissions

Any process information that related to sampled streams was recorded daily. Also, a wide range of sample submission information was recorded in field logs. Records maintained at each treatment plant depended on the type of processes being sampled. A list of typical field record information documented for each sample stream is listed in Table 2-10.

Table 2-10
FIELD RECORD INFORMATION

Information	Stream				
	Influent	Effluent	Recycle	Raw Sludge	Treated Sludge
Hourly Flows	X	X	X		
Daily Flows	X	X	X	X	X
Pump Times			X	X	X
Pump Volumes				X	X
Cl_2 Contact Times		X			
Sample Volume	X	X	X		
Sample Time	X	X	X	X	X
Sample Location	X	X	X	X	X
Sample Weight				X	X
Preservation	X	X	X	X	X
Sample Loss	X	X	X	X	X
Process Irregularity	X	X	X	X	X
Sampler Configuration	X	X	X		
QA/QC Samples	X	X	X	X	X
Samples Submitted	X	X	X	X	X

2.3.6 Field QA/QC Program

The field QA/QC program involved the collection of field blanks. A field blank was an organic free distilled water sample that underwent the same handling in the field and the laboratory as the samples. The purpose of the field blank collection and subsequent analysis was to establish if contamination was being introduced into the samples from the sampling equipment or preservation methods, transportation and/or laboratory handling. In order to determine the sources of contamination, if any, it was necessary to compare field blank results with the laboratory method blank results.

A "grab" sample field blank was prepared by rinsing organic free water in the grab sampling container prior to sampling. The rinse water was placed in the sample bottle and preserved using methods appropriate for the compounds to be analyzed (see Table 2-8).

An automatic sampler field blank was prepared from organic free water which was pumped through the sampler tubing prior to sampling. As above, the water was bottled and preserved according to prescribed methods (Table 2-8).

During the entire program, a total of 19 field blank samples were collected.

In addition to the field QA/QC program, a number of laboratory QA/QC measures were taken; some requiring duplicate sample collection in the field. The laboratory QA/QC procedures are described in Section 3.0.

3.0 ANALYTICAL METHODOLOGY

3.1 Laboratory Analyses

Three laboratories were contracted by MOE to carry out the organics analyses on the samples from the 37 WPCPs. Zenon Environmental Incorporated in Burlington, Ontario did all of the analyses for the volatile organic compounds, dioxin/furan compounds and total phenols. The base neutral and acid extractable compounds were analyzed by Mann Testing Laboratories Ltd., in Mississauga, Ontario and the pesticides and herbicides analyses were carried out in the laboratories of Enviroclean Ltd., in London, Ontario.

In addition, the MOE Laboratory Services Branch (LSB) in Rexdale carried out the analyses for metals, conventional contaminants and cyanide. Table 3-1 presents a complete list of parameters analyzed by each analytical laboratory.

Table 3-2 presents the methods used by the laboratories for analysis of organic compounds and metals. A detailed description of these methods can be found in the individual laboratory reports, summarized by Zenon (Ref. 4). Table 3-3 presents the methods used to analyze the conventional contaminants.

3.2 Laboratory QA/QC Procedures For Trace Organic Compounds

A number of different techniques were regularly used in the laboratory for quality assurance of the analytical results. In addition to these methods, MOE Laboratory Services conducted an external quality assurance program. The quality assurance/quality control methods are presented in the following discussion.

Method Blanks

A method blank was analyzed routinely along with each batch of samples to identify possible contamination contributed by glassware, reagents, other samples, etc. A method blank consisted of an uncontaminated distilled water sample that underwent identical preparation methods (eg. extraction, purge and trap) and was analyzed with the field samples. A method blank was analyzed each time the instrumentation was set up for a new batch of samples.

The method blank analyses were used for two main purposes. Each day of analyses, method blank concentrations of each contaminant were averaged for all of the blanks analyzed that day. The average value was used to correct the concentrations of the particular contaminant in the samples on

Table 3-1
LIST OF CONTAMINANTS ANALYZED BY ANALYTICAL LABORATORIES

MOE Laboratory Services Branch

Metals and Cyanide
(Unfiltered, Total)

Aluminum
Beryllium
Cadmium
Calcium
Chromium
Cobalt
Copper
Iron
Lead
Magnesium
Mercury
Molybdenum
Nickel
Selenium
Silver
Strontium
Zinc
Cyanide

Conventional Contaminants

Alkalinity
Ammonia Nitrogen
Biochemical Oxygen Demand
Chemical Oxygen Demand
Nitrate Nitrogen
Nitrite Nitrogen
Total Kjedhal Nitrogen
Total Phenols
Total Phosphorus
Total Solids
Total Suspended Solids
Turbidity
Volatile Solids
Volatile Suspended Solids

Zenon Environmental Incorporated

Volatile Organic Compounds

1,1,1-Trichloroethane
1,1,2,2-Tetrachloroethane
1,1,2-Trichloroethane
1,1-Dichloroethene
1,2-Dichlorobenzene
1,2-Dichloroethane
1,2-Dichloropropane
1,3-Dichlorobenzene
1,4-Dichlorobenzene
1-Octene
2-Chloroethylvinyl ether
3-Chloro-1-propene
3-Chloro-toluene
Acrolein
Acrylontrile
Benzene
Bromodichlorobenzene
Bromodichloromethane
Bromethane
Bromoform
Carbon tetrachloride
Chlorobenzene
Chloroethane
Chloroform
Chloroethane
cis-1,3-Dichloropropene
cis-1,2-Dichloroethane
Dibromochloromethane
Dichlorodifluoromethane
Diethyl ether
Ethylbenzene
Hexane
Hexanol
Methylene chloride
Styrene
Tetrachloroethene
Toluene
trans-1,3-Dichloropropene
Trichloroethene
Trichlorofluoromethane
Vinyl bromide
Vinyl chloride

Dioxin/Furans

Tetrachlorodibenzodioxins
Tetrachlorodibenzofurans
Pentachlorodibenzodioxins
Pentachlorodibenzofurans
Hexachlorodibenzodioxins
Hexachlorodibenzofurans
Heptachlorodibenzodioxins
Heptachlorodibenzofurans
Octachlorodibenzodioxin
Octachlorodibenzofurans

Total Phenolics

Mann Testing Laboratories Ltd.

Base Neutral and Acid Extractable Compounds

2,4,5-Trichlorophenol
2,4,6-Trichlorophenol
2,4-Dichlorophenol
2,4-Dimethyl Phenol
2,4-Dinitrotoluene
2,4-Dinitro-o-cresol
2,6-Dinitrotoluene
2 Hydroxy-toluene (O-Cresol)
2-Chloronaphthalene
2-Chlorophenol
2-Nitrophenol
3 Hydroxy-toluene (M-Cresol)
4 Hydroxy-toluene (P-Cresol)
4-Bromophenyl phenyl ether
4-Chlorophenyl phenyl ether
9H Fluorene
Acenaphthene
Acenaphthylene
Alpha-naphthylamine
Ametryn
Anthracene
Atrazine
Benzo(a)anthracene
Benzo(a)pyrene
Benzo(b)fluoranthene
Benzo(k)fluoranthene
Beta-naphthylamine
Biphenyl
bis(2-Chloro ethoxy)methane
bis(2-Chloro ethyl)ether
bis(2-Chloroispropyl)ether
bis(2-ethyl hexyl)phthalate
Butyl benzyl phthalate
Chrysene
Diazinon
Dibenzo(ah)anthracene
Dichloran
Diethyl phthalate
Dimethyl phthalate
Diphenyl ether
Di-n-butyl phthalate
Di-n-octyl phthalate
Fluoranthene
Indeno(123-CD)pyrene
Malathion
Naphthalene
Nitrobenzene
N-Nitroso diphenylamine
N-Nitroso-di-n-propyl-amine
Parathion ethyl
Parathion methyl
Pentachlorophenol
Phenanthrene
Phenol
Pyrene
P-chloro-M-cresol
Tri-n-tolyl phosphate

Enviroclean Ltd.

Pestcidies and Herbicides

1,2,4-Trichlorobenzene
2,4,5-Trichlorophenoxyacetic acid
2,4-Dichlorophenoxyacetic acid
Aldrin
Alpha-BHC
Alpha-chlordane
Alpha-endosulphan
Beta-BHC
Beta-endosulphan
Captan
Delta-BHC
Dieldrin
Endosulphan sulphate
Endrin
Endrin aldehyde
Gamma-BHC
Gamma-chlordane
HCB
Heptachlor
Heptachlor epoxide
Hexachlorobutadiene
Hexachlorocyclopentadiene
Hexachloroethane
Methoxychlor
Mirex
Oxychlordane
PCNB
Photomirex
PP-DDD
PP-DDE
PP-DDT
Silvex
Strobane
Total PCB
Toxaphene

Table 3-2
SUMMARY OF ANALYTICAL METHODS FOR TRACE ORGANICS AND METALS USED IN THE STUDY

Contaminant or Contaminant Group	Sample Prepration Method	Analytical Method	Instrumentation	Analytical Laboratory
Volatile Organic Compounds	Purge and trap	Gas Chromatography Mass Spectrometry (GC/MS) Capillary Column	NUTECH 8522 with Finnigan 4510 GCMS with Incos Data System Enviroclean Series 810 and Hewlett Packard (HP) Mass Selective Detector (MSD)	Zenon Environmental Inc.
PCDD/PCDF	Liquid/liquid extraction and cleanup	GC/MS Capillary Column	Finnigan 4510 GC/MS with Incos Data System	Zenon Environmental Inc.
Total Phenols	Dilution (if necessary) and distillation from acidified sample	Direct photometric method		Zenon Environmental Inc.
Acid Extractable Compounds	Liquid/liquid extraction and cleanup	GC/MS Capillary column	HP5970 B Mass Selective Detector HP5890 Gas Chromatograph HP9816 Computer System	Mann Testing Laboratories Ltd.
Base/Neutral Extractable Compounds	Liquid/liquid extraction	GC/MS Capillary column	HP5970 B Mass Selective detector HP5890 Gas Chromatograph HP9816 Computer System	Mann Testing Laboratories Ltd.
PCBs and Organochlorine Insecticides	Liquid/liquid extraction and cleanup	GC/MS Dual Capillary Column	Varian 6000 GC	Enviroclean Ltd.
Phenoxy Acid Herbicides	Liquid/liquid extraction and cleanup	GC/MS Dual Capillary Column	Hewlett Packard 5890	Enviroclean Ltd.
Metals (Ag, As, Cd, Cr, Co, Cu, Hg, Mo, Ni, Pb, Se, Zn, Al, Fe, Be, Ca, Mg)		Inductively Coupled Plasma Spectrometry (ICP) Direct Coupled Plasma Spectrometry (DCP)		MOE LSB

(KIR18/283W)

Table 3-3
SUMMARY OF ANALYTICAL METHODS FOR CONVENTIONAL CONTAMINANTS USED IN THE STUDY

Contaminant	Method	Reference*
pH	pH Electrode	Code 001 AI1 page 249
Chemical Oxygen Demand (COD)	Colourimetric measurement of trivalent chromium	Code 525 1C2 page 237
Biochemical Oxygen Demand (BOD)	Five day incubation	Code 001 A12 page 234
Dissolved Organic Carbon (DOC)	Filtration glass fibre filter ≤ 2 µm, combustion at <1000°C, colourometric detection	Code 102 AC@ page 89
Ammonia plus Ammonium (NH_3)	Distillation, colourimetry	Code 103 DC2 page 191
Nitrate (NO_3)	Colourimetry	Code 102 DC2 page 210
Nitrite (NO_2)	Colourimetry	Code 102 DC2 page 222
Total Kjeldhal Nitrogen (TKN)	Digestion, distillation and colourimetry	Code 004 AC2 page 228
Total Solids (TS)	Drying at 103 °C ± 3°C and gravimetry	Code 202 A16 page 342
Total Suspended Solids (TSS)	Filtration glass fibre filter ≤ 2 µm, drying at 103 °C ± 3°C and gravimetry	Code 506 AD4 Page 348
Volatile Suspended Solids (VSS)	As above, ignite filter for 4 hours at 550°C	Code 506 AD4 page 348
Total Phosphorus (TP)	Digestion, colourimetry	Code 504 AC2 page 279

* "1986 Performance Report", Water Quality Section, Ministry of the Environment

that day. Secondly, the method blank results for all of the analyses were used to determine if the background "noise" level was too high to use the data for a particular contaminant with confidence.

Duplicates

Duplicate samples were defined as two aliquots taken from a single sample and carried through the same analytical process. The purpose of duplicate analyses was to provide a measure of analytical precision. This was carried out by comparing the differences of each set of duplicates, and determining if the differences were statistically significant.

Native Spikes in Distilled Water Samples

A known amount of standard mixture containing selected native compounds on the monitoring list (Table 2-2) was spiked into a reagent water sample, which subsequently underwent the same preparation and analysis as the field samples.

With each batch of samples analyzed, a blank was spiked with each of the compounds to be analyzed in the sample, and the percentage recovery was documented. The following 2 results were then used to evaluate the applicability of the data for each batch of samples:

- The recovery of the native compound from the distilled water blank analyzed for each batch of samples.
- The recovery of the spiked compound from all of the distilled water blanks for the entire study.

Surrogate Spikes in Field Samples

A known amount of mixture containing deuterated target compounds was spiked into the field sample, which was subsequently processed and analyzed. The amount of recovery of the deuterated spike was used to indicate the recovery of the target compound from the sample and the variability of compound recovery.

MOE Laboratory Spiking

Duplicate field samples were sent to the MOE LSB. Some liquid samples and all sludge samples were labelled at the MOE LSB, to indicate they were replicate samples, and were then taken to the contract laboratory for analyses. Other

samples were spiked at the MOE LSB with known concentrations of target compounds of volatiles, organics and pesticides. The spiked samples were relabelled for identification as a spiked replicate of the field sample and then submitted for analyses to the appropriate laboratory. The results of the spiked samples were compared to the replicate unspiked sample. The purpose of the MOE laboratory spiking was to ensure the integrity of the results if the concentrations of native compounds in spiked samples were greater than in non-spiked samples, and to establish parameter stability in transport, storage and analysis.

3.3 Data Management and Review

Analytical and QA/QC results from each of the contract laboratories and from MOE LSB were input into MOE Laboratory Information System (LIS). The results were reviewed and approved by the pertinent MOE laboratory supervisors. The approved results were then transferred from the mainframe LIS to a microcomputer database at MOE using dBase III Plus software (Ashton-Tate) for ease in data analysis and reporting.

The finalized database was sent to CANVIRO for formatting, analysis, interpretation and summarizing.

4.0 WPCP CHARACTERISTICS

4.1 Background

Ideally, to effectively characterize wastewater treatment plant influents, effluents, sludges, removal abilities and drainage basin loadings in terms of HCs for Ontario WPCPs, all plants in Ontario would undergo the monitoring program. Since economic and time constraints would not allow for this, it was necessary to select a smaller group of plants that would be representative of all of the Ontario plants.

4.1.1 Ontario WPCPs

In 1987 in Ontario, there were 412 municipal treatment facilities, treating wastewater at a rate of 5.0 million cubic metres per day for a population of over 7 million people.

The 412 treatment facilities had a total hydraulic design capacity of over 6.0 million cubic metres per day. Figure 4-1 shows that in 1987, 82 percent of the facilities in Ontario had design capacities of less than 10,000 m^3/day and 36 percent of the 412 facilities were less than 1,000 m^3/day. Only 6.8 percent of the plants (27 plants) had capacities greater than 45,000 m^3/day but they contributed greater than 70 percent of the total flow in 1987.

Figure 4-2 shows that in 1987, 52 percent of the facilities in Ontario provided secondary treatment, 7.5 percent provided primary treatment, 39 percent were lagoons and 1.7 percent were facilities with no discharge to surface waters (ie. septic tanks, exfiltration plants). Secondary facilities in Ontario generated the largest portion (76.8 percent) of flow in 1987; 70 percent of which was contributed by conventional activated sludge plants. Lagoons and septic tanks typically serve smaller communities. Consequently, total flow contribution from these types of facilities was less than 2 percent.

The 412 facilities in Ontario are located throughout the Province. Larger facilities are primarily located in the Lake Ontario drainage basin, accounting for 58.4 percent of the total flow (based on 1987 flow) from Ontario plants. Lake Erie and Lake Huron received 17.2 and 7.3 percent respectively. The Ottawa River and St. Lawrence River drainage basins received a total of 13.6 percent and flow into Lake Superior, James Bay and Lake Winnipeg was 3.5 percent.

4.1.2 37 WPCPs in the Study

The total flows in 1987 at the 37 WPCPs was 3.7 million cubic metres per day, or 73.6 of the total Ontario flow for that year. Of the study plants, secondary treatment facil-

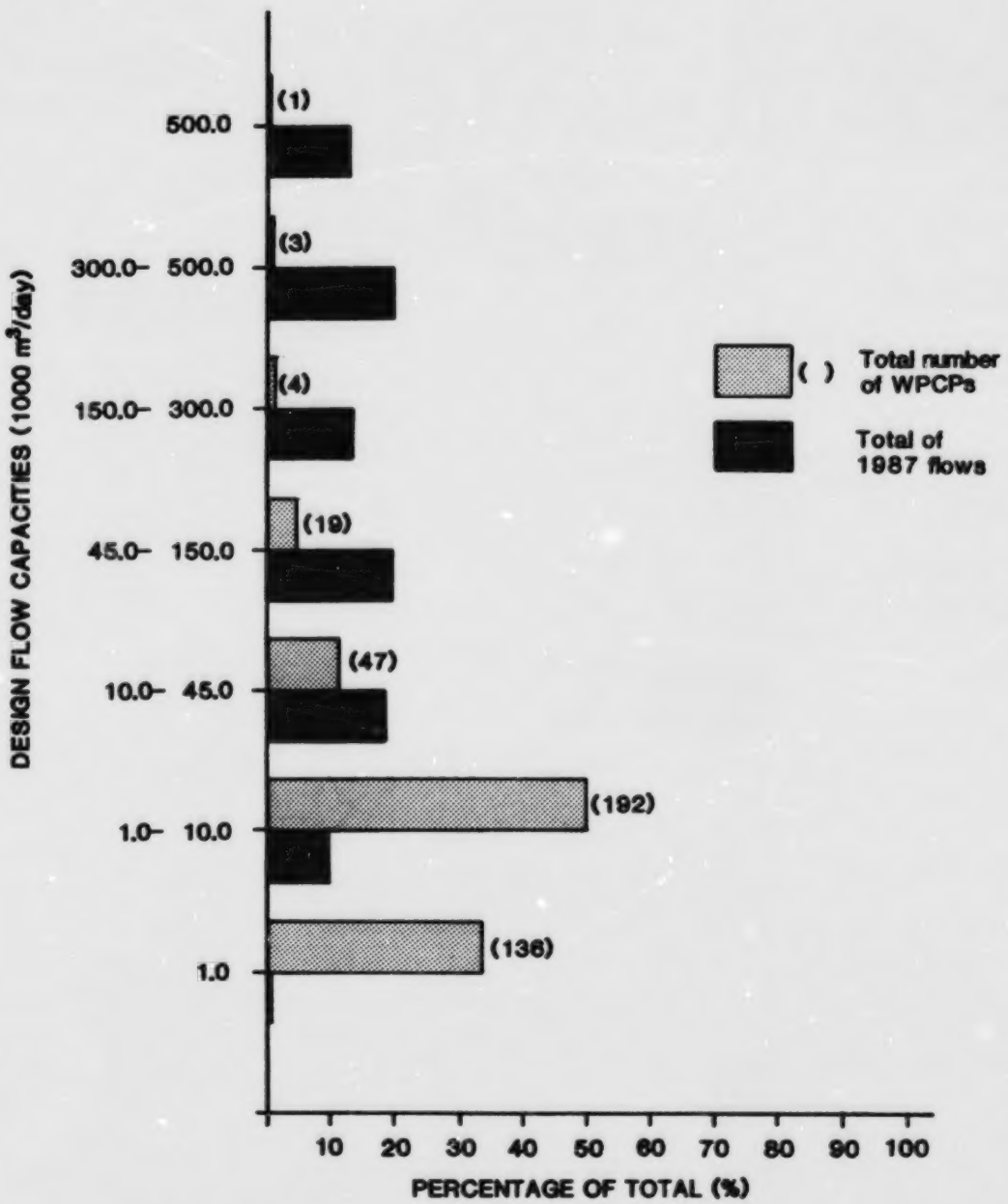

Figure 4-1
HISTOGRAM SHOWING DESIGN FLOW CAPACITIES FOR ONTARIO WPCPs (1987)

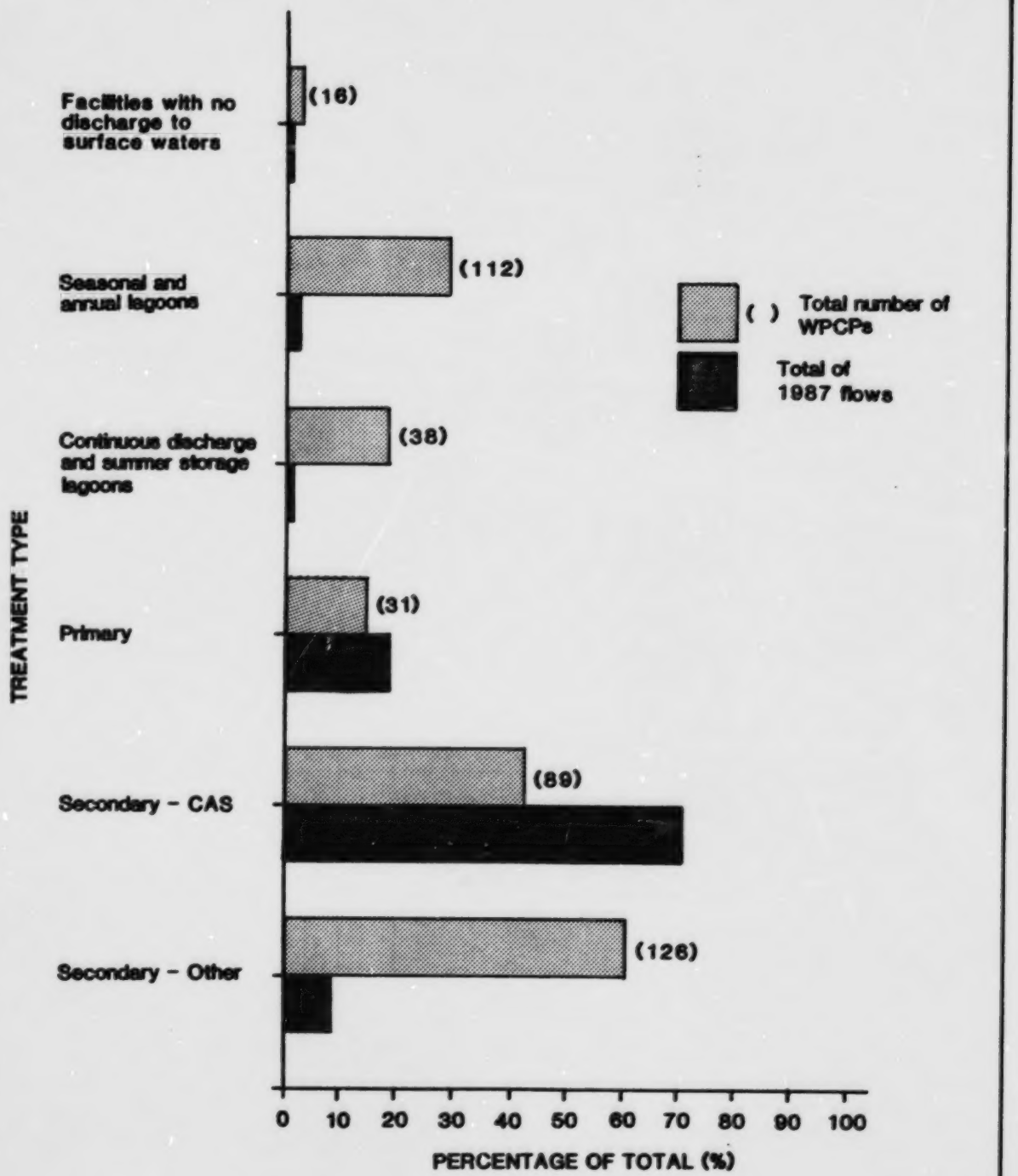

Figure 4-2
HISTOGRAM SHOWING TREATMENT TYPES FOR ONTARIO WPCPs (1987)

CANVIRO

ities contributed to 77.9 percent of flows, primary facilities contributed to 21.6 percent and lagoons to 0.5 percent of these flows.

There were 28 secondary treatment plants involved in the study, comprising 76 percent of the 37 plants. Of these, 23 were conventional activated sludge plants (1 with tertiary treatment), 3 were extended aeration, one was high rate and one used rotating biological contactors.

The largest portion of flows from the selected WPCPs were to the Lake Ontario drainage basin, comprising 64.5 percent. Flows to the Lake Erie drainage basin comprised 16.5 percent, to Lake Huron comprised 2.4 percent and to Lake Superior, 2.2 percent. The Ottawa River and St. Lawrence drainage basins received 14.4 percent of the total flow from the 37 WPCPs.

4.1.3 Comparison Between Ontario WPCPs and 37 WPCPs Selected For Study

The histograms in Figure 4-3 present a comparison of the 37 plants selected for the study to Ontario WPCPs. As noted previously, the study WPCPs represented more than 70 percent of flows from all plants in Ontario in 1987 (Figure 4-3a). The quantities of flows from each type of treatment process (ie. secondary, primary and lagoons) for the study WPCPs are of similar proportions to those for all Ontario WPCPs (Figure 4-3b). In addition, the division of the total Ontario flows to each drainage basin is also represented fairly accurately by the study WPCPs (Figure 4-3d).

Figure 4-3c shows that a larger percentage of secondary treatment facilities were represented in the study than those existing in Ontario. Since one objective of the present study was to estimate the concentrations and/or removals of HCs in secondary WPCPs, a larger proportion of secondary plants was selected.

In summary, it can be observed that the study group of treatment facilities are a representative portion of all Ontario plants.

4.2 Characteristics of 37 WPCPS in Study

4.2.1 Summary of Communities

Table 4-1 presents a summary of the characteristics of the communities served by each of the study WPCPs.

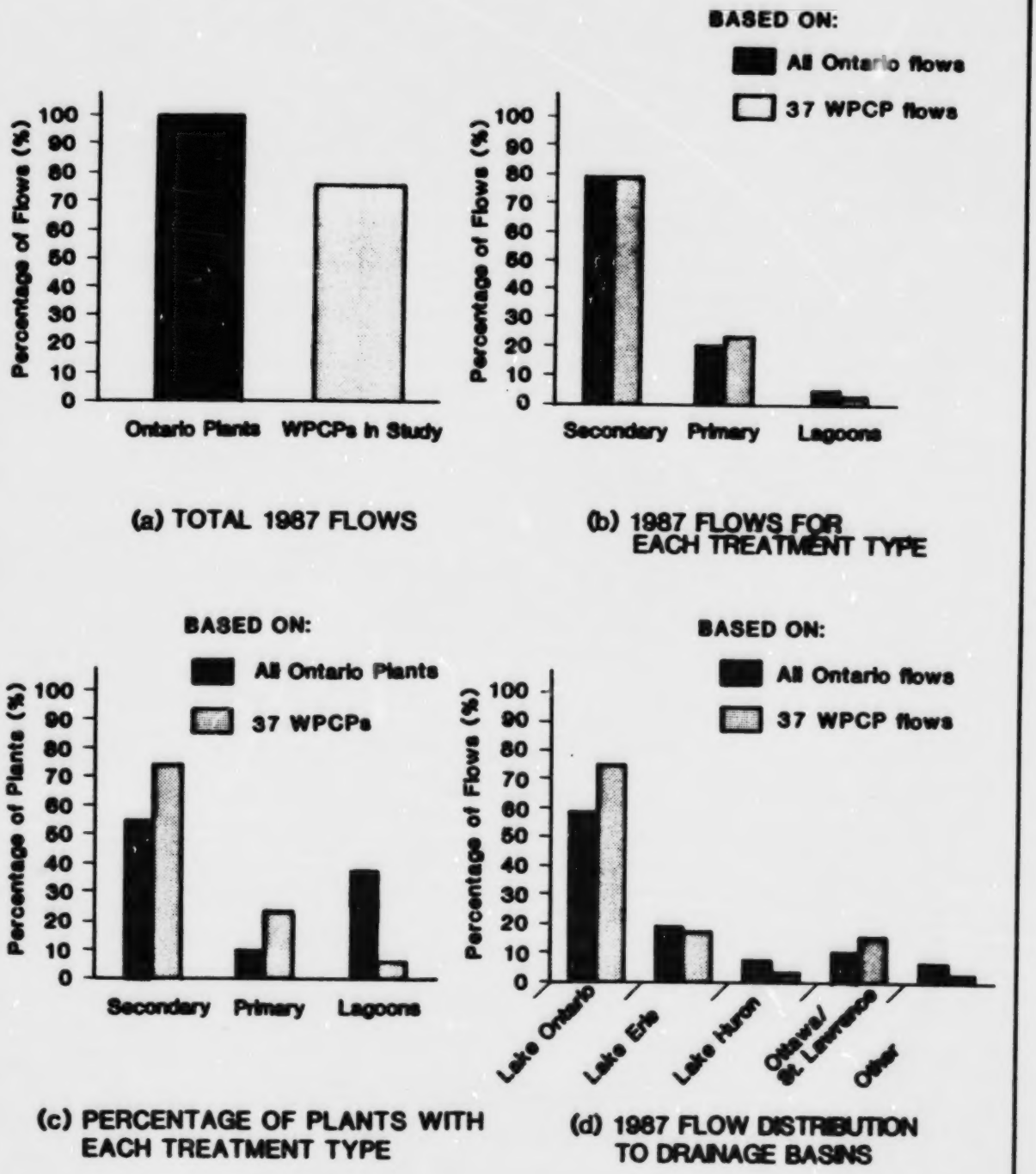

Figure 4-3
HISTOGRAM COMPARING ONTARIO WPCPs TO WPCPs SELECTED FOR THE STUDY

Table 4-1
SUMMARY OF COMMUNITIES OF 37 WPCPs

Plant	Population Served	Receiving Watercourse	Drainage Basin	% Industrial Flow
Guelph	82,000	Grand River	Lake Erie	25%
Belle River (Maidstone)	7,581	Lake St. Clair	Lake Erie	8%
Brantford	73,000	Grand River	Lake Erie	40%
Burlington (Skyway)	120,000	Hamilton Harbour	Lake Ontario	17%
Grimsby (Baker Rd.)	19,850	Lake Ontario	Lake Ontario	0%
Hamilton (Woodward)	300,000	Redhill Creek	Lake Ontario	10%
Kingston TWP	18,700	Lake Ontario	Lake Ontario	4%
Kitchener	138,271	Grand River	Lake Erie	39%
London (Greenway)	164,614	Thames River	Lake Erie	8%
London (Pottersburg)	25,979	Thames River	Lake Erie	9%
Mississauga (Clarkson)	120,000	Lake Ontario	Lake Ontario	25%
Mississauga (Lakeview)	370,000	Lake Ontario	Lake Ontario	12%
Moore (Corunna)	3,405	St. Clair River	Lake Erie	<1%
Oakville (S.E.)	21,900	Lake Ontario	Lake Ontario	<1%
Niagara Falls (Stamford)	67,835	Chippawa Power Canal	Lake Ontario	18%
Paris	4,359	Grand River	Lake Erie	32%
Peterborough	61,063	Otonabee River	Lake Ontario	22%
Pickering (Duffin Creek)	64,386	Lake Ontario	Lake Ontario	25%
Sault Ste. Marie (West)		St. Mary's River	Lake Huron	-
Sudbury	95,000	Junction Creek	Lake Huron	1%
Toronto (Highland Creek)	290,000	Lake Ontario	Lake Ontario	22%
Toronto (Humber)	660,000	Lake Ontario	Lake Ontario	19%
Toronto (Main)	1,200,000	Lake Ontario	Lake Ontario	8%
Toronto (North)	55,000	Don River	Lake Ontario	8%
Waterloo	66,627	Grand River	Lake Erie	13%
Wallaceburg	9,200	Sydenham River	Lake Erie	37%
Whitby (Pringle Ck #1)	10,925	Pringle Creek	Lake Ontario	22%
Windsor (Little River)	64,000	Little River	Lake Erie	24%
Cornwall	46,800	St. Lawrence River	St. Lawrence River	10%
Kingston (City)	67,000	St. Lawrence River	St. Lawrence River	2%
Ottawa (Green Creek)	450,000	Ottawa River	Ottawa River	3%
Sarnia	64,475	St. Clair River	Lake Erie	7%
Sault Ste. Marie (East)	75,000	St. Mary's River	Lake Huron	26%
Thunder Bay	101,529	Kaministikwia River	Lake Superior	9%
Windsor (Westerly)	123,000	Detroit River	Lake Erie	28%
Lindsay	14,636	Scugog River	Lake Ontario	19%
Niagara-on-the-Lake	5,210	Lake Ontario	Lake Ontario	25%

The population of the communities (based on 1987 MOE data) served by the WPCPs range from under 5,000 for Moore (Corunna) and Paris to cities of greater than 100,000 (Burlington, Hamilton, London, Mississauga, Toronto, Thunder Bay, and Windsor).

The receiving water courses for the plants depend on the geographic location of the communities being served. Typically, the receiving water course is a creek or river that is a tributary of one of the Great Lakes. Only 10 plants discharge directly into the major drainage basin of Lake Ontario (3 Toronto plants, 2 Mississauga plants, Pickering, Grimsby, Kingston, Niagara-on-the-Lake and Oakville), and one plant into the St. Lawrence River (Cornwall).

The industrial flow contributions to the study WPCPs range from less than 1 percent for Grimsby (Baker Road) WPCP, Oakville S.E. WPCP and Moore (Corunna) WPCP to about 40 percent for a number of WPCPs. The industrial flow data was taken from a separate MOE study. Municipalities were requested to provide MOE with annual water use data for the industries that discharged to the 37 WPCPs. Industrial flow into each WPCP was then estimated as 85 percent of the total annual water use for 250 days per year. Since annual water use data were not available for many industries, the industrial flow data percentages in Table 4-1 should be considered very approximate (Ref. 4).

4.2.2 Summary of WPCP Design Characteristics

A summary of the WPCP design characteristics, including flows, process type and sludge treatment and disposal methods is presented in Table 4-2.

Ten of the study plants have design flow capacities of greater than 100,000 m^3/d, 12 have capacities in the range of 45,000-100,000 m^3/d, 9 are in the range of 10,000-45,000 m^3/d, and 6 have design capacities of less than 10,000 m^3/d.

The percentage utilization of the plant design capacity (based on 1987 average daily flows) ranged from 36% for the new Sault Ste. Marie (West) plant to plants operating at or beyond their hydraulic design capacities (Waterloo, Wallaceburg, Cornwall, Toronto (Humber) and Niagara-on-the-Lake).

All of the secondary plants with the exception of Hamilton (Woodward) and Sudbury practice continuous chemical addition for phosphorus removal. Woodward WPCP used the industrially contributed iron in the raw wastewater for phosphorus removal. Sudbury was not practicing phosphorus removal at the time of the study. However, phosphorus removal equipment is presently being installed. All of the primary plants, with the exception of the Sault Ste. Marie (East) plant, also had continuous addition of chemicals for phosphorus removal. Only Lindsay lagoon uses chemicals for phosphorus removal. The Niagara-on-the-Lake lagoon has no phosphorus removal facilities.

Table 4-2

SUMMARY OF WPCP DESIGN AND FLOW DATA

Plant	Design Flow Capacity ($10^3 m^3$/day)	1987 Average Flow ($10^3 m^3$/day)	1987 Flow as % of Design	Process	Phosphorus Removal	Sludge Treatment	Sludge Disposal
Tertiary Plants							
Guelph	54.55	43.42	79.6	Conventional activated sludge plus RBC's plus filtration	Continuous	Co-thickening/anaerobic digestion/filter dewatering	Drying beds or landfill
Secondary Plants							
Belle River (Maidstone)	6.82	5.60	82.1	Extended aeration	Continuous	Aerobic Digestion	Hauled
Brantford	81.83	52.10	63.7	Conventional activated sludge	Continuous	Co-thickening/anaerobic digestion	Agricultural land or lagoon
Burlington (Skyway)	93.19	67.03	71.9	Conventional activated sludge	Continuous	Co-thickening/anaerobic digestion	Incineration and/or agricultural land
Grimsby (Baker Road)	18.18	13.05	71.8	Conventional activated sludge	Continuous	Anaerobic digestion	Agricultural land
Hamilton (Woodward)	409.14	306.47	74.9	Conventional activated sludge	Without Chemicals	Co-thickening/anaerobic digestion/filter dewatering	Incineration
Kingston TWP	25.00	18.03	72.1	Conventional activated sludge	Continuous	Anaerobic digestion	Drying bed on lagoon
Kitchener	122.70	70.58	57.5	Conventional activated sludge	Continuous	Anaerobic digestion/	Agricultural land
London (Greenway)	122.70	110.8	90.3	Conventional activated sludge	Continuous	Dissolved air flotation/ belt press dewatering	Incineration
London (Pottersburg)	22.05	16.33	74.1	Conventional activated sludge	Continuous	Co-thickening/storage	Incineration
Mississauga (Clarkson)	109.10	74.7	68.5	Conventional activated sludge	Continuous	Co-thickening/anaerobic digestion	Incineration or Agricultural land
Mississauga (Lakeview)	284.13	256.9	90.4	Conventional activated sludge	Continuous	Centrifuge thickening/ theraml conditioning/ vacuum filtration/ anaerobic digestion	Incineration and ash lagoon
Moore (Corunna)	4.46	2.18	47.9	Extended aeration	Continuous	Holding tank, decanted	
Niagara Falls (Stamford)	58.20	-	-	Rotating biological contactors	Continuous	Anaerobic digestion	Lagoon

(KIR18/284W)

Table 4-2
Continued

Plant	Design Flow Capacity ($10^3 m^3$/day)	1987 Average Flow ($10^3 m^3$/day)	1987 Flow as % of Design	Process	Phosphorus Removal	Sludge Treatment	Sludge Disposal
Oakville (S.E.)	22.73	13.52	59.5	Conventional activated sludge	Continuous	Co-thickening/anaerobic digestion	Agricultural land
Paris	7.05	2.52	35.7	Extended aeration	Continuous	Aerobic digestion/ thickening/storage	Agricultural land
Peterborough	68.19	50.79	74.5	Conventional activated sludge	Continuous	Co-thickening anaerobic digestion	Agricultural land
Pickering (Duffin Creek)	189.25	176.0	93.0	Conventional activated sludgde	Continuous	Co-thickening anaerobic digestion/filter dewatering	Incineration
Sault Ste. Marie (West)	18.18	6.65	36.6	Conventional activated sludge	Continuous	Co-thickening/filter dewatering	Landfill
Sudbury	68.19	48.97	71.8	High rate	No removal	Anaerobic digestion	Hauled
Toronto (Highland Creek)	218.21	170.0	77.9	Conventional activated sludge	Continuous	Dissolved air flotation/ anaerobic digestion/ grinding/heat treatment/ centrifuge dewatering	Incineration
Toronto (Humber)	409.19	402.7	98.4	Conventional activated sludge	Continuous	Dissolved air flotation/ anaerobic digestion/ elutriation/vacuum filtration	Landfill
Toronto (Main)	818.3	767.2	93.8	Conventional activated sludge	Continuous	Dissolved air flotation/ anaerobic digestion/thermal oxidation/filter dewatering	Incineration
Toronto (North)	45.46	36.65	80.6	Conventional activated sludge	Continuous	Anaerobic digestion/ centrifuge dewatering	Landfill
Waterloo	45.46	46.38	102.0	Conventional activated sludge	Continuous	Co-thickening/anaerobic digestion	Agricultural land
Wallaceburg	6.82	6.76	99.1	Conventional activated sludge	Continuous	Anaerobic digestion/filter dewatering	
Whitby (Pringle Cr. #1)	5.68	3.61	63.6	Conventional activated sludge	Continuous	Co-thickening/anaerobic digestion	Hauled to Whitby (Corbett Ck.) WPCP
Windsor (Little River)	36.32	32.76	90.2	Conventional activated sludge	Continuous	Co-thickening/centrifuge dewatering	Landfill

(KIR18/284W)

Table 4-2
Continued

Plant	Design Flow Capacity ($10^3 m^3$/day)	1987 Average Flow ($10^3 m^3$/day)	1987 Flow as % of Design	Process	Phosphorus Removal	Sludge Treatment	Sludge Disposal
Primary Plants							
Cornwall	37.50	43.68	116.5	Primary	Continuous	Anaerobic digestion/ centrifuge dewatering	Landfill
Kingston (City)	61.37	63.48	103.4	Primary	Continuous	Anaerobic digestion (centrifuge dewatering)/ storage	Agricultural land
Ottawa (Green Creek)	545.0	400.25	73.4	Primary	Continuous	Anaerobic digestion	Lagoon
Sarnia	70.47	54.00	76.6	Primary	Continuous	Anaerobic digestion	Lagoon
Sault Ste. Marie (East)	54.55	32.02	58.7	Primary	No removal	Vacuum filtration	
Thunder Bay	109.11	81.11	74.3	Primary	Continuous	Anaerobic digestion	Landfill
Windsor (Westerly)	163.65	123.64	75.6	Primary with polymer addition	Continuous	Centrifuge dewatering/ composting	Agricultural land
Lagoons							
Lindsay	17.18	14.18	82.5	Aerated cells plus lagoon	No removal	No sludge production	-
Niagara-on-the-Lake	3.80	6.40	168.4	Conventional lagoon	No removal	No sludge production	-

(KIR18/204N)

A wide range of sludge treatment methods were used at the 37 WPCPs to reduce the sludge volume before ultimate disposal. Processes for pre-thickening (not including co-thickening in the primary clarifiers) are used at 5 facilities. Anaerobic digestion of sludges is used at the majority (26) of the facilities. Two of the plants (Belle River, Clarkson) use aerobic digestion and 7 plants do not have sludge digestion processes before disposal, but do utilize dewatering processes. Additional treatment of digested sludges included dewatering (13 plants), elutriation (Humber WPCP) and heat treatment (Highland Creek WPCP, Main WPCP and Lakeview WPCP).

Three main methods of sludge disposal are utilized, including incineration application to agricultural land and landfilling. In some cases, sludge is transferred to another WPCP for treatment and/or disposal.

4.2.3 Historical WPCP Performance Summary

Table 4-3 presents the annual average effluent concentrations of BOD_5, suspended solids (TSS) and phosphorus for the 37 plants of this study, for 1986 and 1987. Also indicated is whether the plant complied with the MOE minimum effluent requirements for municipal treatment facilities presented in Table 4-4. It should be noted that plant specific effluent requirements, as required by some WPCPs, were not considered in the evaluation of compliance.

Table 4-3 shows that the secondary plants selected have generally complied in the past with the BOD_5 and TSS requirements. Out of the 7 primary plants, Cornwall WPCP did not comply with TSS requirements in both years, and Ottawa (Green Ck) WPCP did not comply with BOD_5 removal requirements in both years. Both Lindsay and Niagara-on-the-Lake lagoons were in compliance with respect to BOD_5 in both years. However, Lindsay did not comply with TSS limits in 1987.

In 1986 and 1987, only 24 of the study plants were in compliance with the phosphorus requirement of ≤ 1.0 mg/L, assessed on a monthly average basis. Seven plants were out of compliance in one year, and 3 plants (Peterborough, Cornwall and Green Creek) did not comply in either year. Three plants (Sudbury, Sault Ste. Marie East, and Niagara-on-the-Lake) did not have phosphorus removal in 1986 and 1987 and therefore were not subjected to a phosphorus requirement.

Table 4-3

SUMMARY OF HISTORICAL PERFORMANCE OF 37 WPCPs (1981-1986)

Plant	Annual Average Effluent BOD_5 (mg/L)				Annual Average Effluent TSS (mg/L)				Annual Average Effluent TP (mg/L)				Comments
			Compliance				Compliance				Compliance*		
	1986	1987	1986	1987	1986	1987	1986	1987	1986	1987	1986	1987	
Tertiary													
Guelph	10.7	14.1			8.9	12.8			1.0	0.6	N		
Secondary													
Belle River (Maidstone)	16.7	4.9			14.8	11.1			0.8	0.7			
Brantford	12.2	13.4			10.4	11.2			0.8	1.0		N	
Burlington (Skyway)	10.8	9.3			9.5	7.3			0.7	0.7			
Grimsby (Baker Road)	13.8	20.6			9.4	11.0			0.5	0.5			
Hamilton	15.7	27.5	N		19.1	12.3			0.7	1.0		N	Phosphorus removal without chemicals
Kingston TWP	8.3	7.5			9.5	8.1			1.0	0.8	N		
Kitchener	12.1	15.5			5.2	5.2			0.7	0.8			
London (Greenway)	4.0	4.8			10.1	12.3			0.7	0.7			
London (Pottersburg)	2.6	3.3			4.3	5.3			0.6	0.6			
Mississauga (Clarkson)	12.7	14.2			9.2	10.0			0.8	0.9			
Mississauga (Lakeview)	16.4	17.8			14.0	14.3			0.6	0.7			
Moore (Corunna)	7.0	7.0			9.8	7.5			0.6	0.4			
Niagara Falls (Stamford)	20.9	11.9			16.5	15.8			0.6	0.7			Primary plant before 1987
Oakville (S.E.)	5.0	2.9			8.4	6.5			0.6	0.5			
Paris	8.7	5.0			6.6	5.4			0.6	0.5			
Peterborough	14.3	9.9			5.5	6.2			3.6	1.0	N	N	
Pickering (Duffin Creek)	22.3	19.8			20.6	13.4			1.0	0.6	N		
Sault Ste. Marie (West)	12.2	11.5			9.9	8.6			1.0	0.9	N		
Sudbury	12.9	12.2			12.6	8.3			2.2	2.3	NR	NR	No phosphorus removal at present. 1988 installation.
Toronto (Highland Creek)	18.7	9.8			23.8	19.0			0.8	0.8			
Toronto (Humber)	11.3	9.0			21.1	20.1			1.0	0.9	N		

Notes: * Compliance is assessed on a monthly average. For compliance, all months TP average $\leq$1.0 mg/L.
NR = No effluent requirements for plants without phosphorus removal.

(KIR18/284W)

Table 4-3
Continued

Plant	Annual Average Effluent BOD_5 (mg/L)				Annual Average Effluent TSS (mg/L)				Annual Average Effluent TP (mg/L)				Comments
			Compliance				Compliance				Compliance*		
	1986	1987	1986	1987	1986	1987	1986	1987	1986	1987	1986	1987	
Toronto (Main)	17.1	11.4			29.6	23.0	N		0.9	0.6			
Toronto (North)	17.9	18.1			6.6	9.3			0.7	0.8			
Waterloo	6.8	7.5			9.3	14.3			0.9	0.8			
Wallaceburg	16.9	11.1			14.2	9.6			0.5	0.7			
Whitby (Pringle Cr. #1)	10.2	6.3			10.4	12.3			0.6	0.6			
Windsor (Little River)	5.4	5.1			9.1	8.8			0.7	0.5			
Primary													
Cornwall	41.1	38.6	N	N	25.5	28.6			2.5	1.0	N	N	
Kingston (City)	23.7	18.1			16.5	16.5			0.6	0.6			
Ottawa (Green Cr.)	34.5	38.6			72.9	32.5	N	N	1.9	2.2	N	N	
Sarnia	33.1	39.1			20.2	24.1			0.7	0.9			
Sault Ste. Marie (East)	69.9	66.1			41.5	38.8			3.4	2.4	NR	NR	No phosphorous removal
Thunder Bay	53.2	57.7			51.4	70.7			0.9	1.0			
Windsor (Westerly)	25.9	24.2			20.6	23.3			0.7	0.7			
Lagoons													
Lindsay	10.5	10.5			81.1	11.0	N		2.6	0.7			
Niagara-on-the-Lake	27.7	23.5			26.9	28.0			3.1	3.3	NR	NR	No phosphorous removal

Notes: * Compliance is assessed on a monthly average. For compliance, all months TP average $\leq$1.0 mg/L.
NR = No effluent requirements for plants without phosphorus removal.

(KIR18/284W)

Table 4-4
MOE 1987 Effluent Discharge Requirements for
Ontario Wastewater Treatment Facilities

Treatment Type	Requirements		Basis
Secondary with phosphorus removal	BOD_5	≤25 mg/L	Annual Average
	TSS	≤25 mg/L	Annual Average
	TP	≤1.0 mg/L	Monthly Average
Secondary without phosphorus removal	BOD_5	≤25 mg/L	Annual Average
	TSS	≤25 mg/L	Annual Average
Primary with phosphorus removal	BOD_5	Removal ≥50%	Annual Average
	TSS	Removal ≥70%	Annual Average
	TP	≤1.0 mg/L	Monthly Average
Primary without phosphorus removal	BOD_5	Removal >30%	Annual Average
	TSS	Removal >50%	Annual Average
Lagoon with phosphorus removal	BOD_5	≤30 mg/L	Annual Average
	TSS	≤40 mg/L	Annual Average
	TP	≤1.0 mg/L	Monthly Average
Lagoon without phosphorus removal	BOD_5	≤30 mg/L	Annual Average
	TSS	≤40 mg/L	Annual Average
			Monthly Average

5.0 RESULTS AND ANALYSIS

5.1 QA/QC Analytical Results

Detailed descriptions of the QA/QC program results from each contract laboratory are presented in individual laboratory reports, which in turn have been summarized in a report by Zenon Environmental Inc. (Ref. 4).

5.1.1 Detection Limits (DLs)

For the purposes of the present study, each target pollutant in each sample type was assigned a detection limit (DL). It was not intended that the DLs represent the lowest detection capability achievable, but rather, that they reflect a routinely available capability that would serve the needs of the study. In this regard, the statistical significance of a true method detection limit (MDL) (Ref. 5) cannot be used for the DLs. The resulting DLs for the present study for samples of raw wastewater, effluent water and sludges are presented in Tables 5-1(a) to 5-1(c).

For base neutral and acid extractable compounds (Table 5-1(a)) compound DLs were in the range of 10 to 75 µg/L for raw sewage, 2 to 15 µg/L for final effluents and 0.2 to 2 mg/L for sludges.

For volatile organic compounds, (Table 5-1(b)), compound DLs were in the range of 40 - 400 µg/L (with one exception of 5 mg/L for hexanol) for raw sewage, 2 to 100 µg/L (with the exception of 400 µg/L for hexanol) for final effluents, and from 40 to 400 µg/L (5 mg/L for hexanol) for sludges.

For pesticides and herbicides, compound DLs were in the range of 0.02 to 10 µg/L for raw sewage, 0.01 to 2 µg/L for final effluents and 0.2 to 100 µg/L for sludges.

For dioxin/furan analyses, due to the complexity of the samples, the DLs were highly variable depending on the cleanliness, homogeneity and interference associated with an individual sample. Therefore, a DL was established for each individual sample. The DLs for more than 95 percent of the samples ranged from 0.1 to 5 ng/L for raw sewage and final effluents, and from 0.05 to 4 µg/L for sludges. Table 5-1(d) presents the minimum DLs found for each of the compounds.

For metals analyses (Table 5-1(e)) DLs ranged from 0.01 to 0.05 mg/L for raw sewages and final effluents. The DL for mercury was the exception with a value of 0.01 µg/L. The range of metals DLs for sludges was 0.01 to 3 mg/L, with a DL for mercury of 0.01 µg/L. The method detection limit for cyanide was 1 µg/L for all three sample types.

Table 5-1(a)
DETECTION LIMITS BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS

Compound Name	Compound Code	DL Raw Sewage (µg/L)	DL Effluents (µg/L)	DL Sludges (liquid) (µg/L)
2,4,5-Trichlorophenol	X3245	25	5	500
2,4,6-Trichlorophenol	X3246	25	5	500
2,4-Dichlorophenol	PM24DP	25	5	500
2,4-Dimethyl phenol	PM24MP	25	5	500
2,4-Dinitrotoluene	PM26DT	15	3	300
2,6-Dinitrotoluene	PM24DT	15	3	300
2 Hydroxy-toluene (O-Cresol)	PMOCRE	15	3	300
2-Chloronaphthalene	PN2CNA	10	2	200
2-Chlorophenol	X30010	25	5	500
2-Nitrophenol	PM2NP	25	5	500
3 Hydroxy-toluene (M-Cresol)	PMMCRE	15	3	300
4 Hydroxy-toluene (P-Cresol)	PMPCRE	15	3	300
4-Bromophenyl phenyl ether	PM4BPE	15	3	300
4-Chlorophenyl phenyl ether	PM4CPE	10	2	200
9H Fluorene	PNFLUO	10	2	200
Acenaphthene	PNACNE	15	3	300
Acenaphthylene	PNACNY	15	3	300
Alpha-naphthylamine	PMANAA	50	10	1000
Ametryn	P2AMET	25	5	500
Anthracene	PNANTH	10	2	200
Atrazine	P2ATRA	25	2	500
Benzo(a)anthracene	PNBAA	10	2	200
Benzo(a)pyrene	PNBAP	10	2	200
Benzo(b)fluoranthene	PNBBFA	10	2	200
Benzo(k)fluoranthene	PNBKF	10	2	200
Beta-naphthylamine	PMBNAA	75	15	2000
Biphenyl	PNB1PH	15	3	300
bis(2-Chloro ethoxy)methane	PMB2EM	10	2	200
bis(2-Chloro ethyl)ether	PMB2NE	15	3	300
bis(2-Chloroispropyl)ether	PMB2IE	10	2	200
bis(2-ethyl hexyl)phthalate	PMBEHP	10	2	200
Butyl benzyl phthalate	PMBBP	10	2	200
Chrysene	PNCHRY	10	2	200
Diazinon	P4DIAZ	25	5	500
Dibenzo(ah)anthracene	PNDAHA	25	5	500
Dichloran	PODICH	50	10	1000
Diethyl phthalate	PMDEP	25	5	500
Dimethyl phthalate	PMDMP	10	5	200
Diphenyl ether	PMDPE	25	5	500
Di-n-butyl phthalate	PMDNBP	10	2	200
Di-n-octyl phthalate	PMDNOP	15	3	300
Fluoranthene	PNFLAN	10	2	200
Indeno(123-CD)pyrene	PNINP	25	5	500
Malathion	P4MALA	25	5	500
Naphthalene	PNNAPH	10	2	200
Nitrobenzene	PMNITB	10	2	200
N-Nitroso diphenylamine	PMNND	10	2	200
N-Nitroso-di-n-propyl-amine	PMNNP	2	10	200
Parathion ethyl	P4EPAR	25	5	500
Parathion methyl	P4MPAR	25	5	500
Pentachlorophenol	X3PCPH	25	5	500
Phenanthrene	PNPHEN	10	2	200
Phenol	PMPHEN	15	3	300
Pyrene	PNPYR	15	3	300
P-chloro-M-cresol	PMPCMC	25	5	500
Tri-n-tolyl phosphate	POTOC			

Table 5-1(b)
DETECTION LIMITS FOR VOLATILE ORGANIC COMPOUNDS

Compound Name	Compound Code	DL Raw Sewage (µg/L)	DL Effluents (µg/L)	DL Sludges (liquid) (µg/L)
1,1,1-Trichloroethane	X1111T	40	2	40
1,1,2,2-Tetrachloroethane	X11122	40	2	40
1,1,2-Trichloroethane	X1112T	40	5	40
1,1-Dichloroethene	X111CE	40	2	40
1,1-Dichloroethene	X1DCLE	40	2	40
1,2-Dichlorobenzene	X212CB	40	2	40
1,2-Dichloroethane	X112CE	40	2	40
1,2-Dichloropropane	X112CP	40	2	40
1,3-Dichlorobenzene	X213CB	40	2	40
1,4-Dichlorobenzene	X214CB	40	2	40
1-Octene	B1OCTE	60	3	60
2-Chloroethylvinyl ether	PM2CEE	40	10	40
3-Chloro-1-propene	X2CPPE	40	2	40
3-Chloro-toluene	X23CTD	40	2	40
Acrolein	X2ACRO	400	100	400
Acrylonitrile	X1ACRY	400	100	400
Benzene	B2BENZ	40	2	40
Bromodichlorobenzene	B2BDCL	40	10	40
Bromodichloromethane	X1BDCM	60	3	60
Bromoethane	X1BETH	40	2	40
Bromoform	XIBROM	60	10	60
Carbon tetrachloride	X1CTET	40	2	40
Chlorobenzene	X2CBEN	40	2	
Chloroethane	XICHLE	40	2	40
Chloroform	XICHLO	40	2	40
Chloromethane	X1CHLM	40	20	40
cis-1,3-Dichloropropene	X113DP	60	3	60
cis-1,2-Dichloroethylene	X1CDCE	40	2	
Dibromochloromethane	X1CDBM	40	2	
Dichlorodifluoromethane	XIDCFM	40	20	40
Diethyl ether	E1DIEE	40	2	40
Ethylbenzene	B2BENZ	40	2	40
Hexane	B1HEXA	60	3	60
Hexanol	L1HEX	5000	400	5000
Methylene chloride	X1DCLM	60	3	60
Styrene	B2STYR	40	3	40
Tetrachloroethylene	XITETR	40	2	
Toluene	B2TOLU	40	2	40
trans-1,3-dichloropropene	X113DR	40	2	40
Trichloroethylene	X1TRIC	40	2	
Trichlorofluoromethane	X1TCFM	40	2	40
Vinyl bromide	B1VBR	60	3	60
Vinyl chloride	X1VCL	100	50	100

Table 5-1(c)
DETECTION LIMITS FOR PESTICIDES AND HERBICIDES

Compound Name	Compound Code	DL Raw Sewage (µg/L)	DL Effluents (µg/L)	DL Sludges (liquid) (µg/L)
1,2,4-Trichlorobenzene	X2124	0.02	0.01	0.2
2,4,5-T	P3245T	0.1	0.05	1
2,4-D	P324D	0.04	0.02	0.4
Aldrin	P1ALDR	0.04	0.02	0.2
Alpha-BHC	P1BHCA	0.02	0.01	0.2
Alpha-chlordane	P1CHLA	0.02	0.01	0.2
Alpha-endosulphan	P1END1	0.02	0.01	0.2
Beta-BHC	P1BHCB	0.02	0.01	0.2
Beta-endosulphan	P1END2	0.02	0.01	0.2
Captan	P0CAPN	0.4	0.2	4
Delta-BHC	P1BCHD	0.02	0.01	0.2
Dieldrin	P1DIEL	0.02	0.01	0.2
Endosulphan sulphate	P1ENDS	0.08	0.04	0.8
Eldrin	P1ENDR	0.02	0.01	0.2
Eldrin aldehyde	P1ENDA	0.4	0.2	4.0
Gamma-BHC	P1BHCG	0.02	0.01	0.2
Gamma-chlordane	P1CHLG	0.02	0.01	0.2
Heptachlor	P1HEPT	0.02	0.01	0.2
Heptachlor epoxide	P1HEPE	0.02	0.01	0.2
Hexachlorobenzene	X2HCB	0.02	0.01	0.2
Hexachlorobutadiene	X1HCB	0.2	0.1	2
Hexachlorocyclopentadiene	X1HCCP	0.2	0.1	2
Hexachloroethane	X1DCLE	10	2	40
Methoxychlor	P1DMDT	0.01	0.05	1.1
Mirex	P1MIRX	0.02	0.01	0.2
Oxychlordane	P1DCHL	0.02	0.01	0.2
PCNB	P0PCNB	0.1	0.05	1
Photomirex	P1PMIR	0.02	0.01	0.2
PP-DDD	P1PPDD	0.02	0.01	0.2
PP-DDE	P1PPDE	0.02	0.01	0.2
PP-DDT	P1PPDT	0.02	0.04	0.8
Silvex	P3SILV	0.1	0.05	1
Strobane	P1STRO	10	5	100
Total PCB	P1PCPT	0.08	0.04	0.8
Toxaphene	P1TOX	0.08	0.04	0.8

Table 5-1(d)
DETECTION LIMITS FOR DIOXIN/FURAN COMPOUNDS

Compound Name	Compound Code	DL Raw Sewage (ng/L)	DL Effluents (ng/L)	DL Sludges (liquid) (µg/L)
Tetrachlorodibenzodioxins	P94CDD	0.5	0.1	0.15
Tetrachlorodibenzofurans	P94CDF	0.2	0.1	1.50
Pentachlorodibenzodioxins	P95CDD	1.0	0.5	0.6
Pentachlorodibenzofurans	P95CDF	0.4	0.1	0.5
Hexachlorodibenzodioxins	P96CDD	1.0	0.3	0.4
Hexachlorodibenzofurans	P96CDF	0.7	0.1	1.0
Heptachlorodibenzodioxins	P97CDD	1.0	0.1	2.0
Heptachlorodibenzofurans	P97CDF	1.0	0.1	1.0
Octachlorodibenzodioxin	P98CDD	1.0	0.3	0.2
Octachlorodibenzofuran	P98CDF	1.0	0.2	0.5

Table 5-1(e)
DETECTION LIMITS FOR METALS AND CYANIDE

Compound Name	Compound Code	DL Raw Sewage (mg/L)	DL Effluents (mg/L)	DL Sludges (liquid) (mg/L)
Aluminum	ALUT	0.02	0.02	0.5
Beryllium	BEUT	0.01	0.01	0.5
Cadmium	CDUT	0.003	0.003	0.5
Calcium	CAUT	0.002	0.002	0.5
Chromium	CRUT	0.01	0.01	0.5
Cobalt	COUT	0.01	0.01	1
Copper	CUUT	0.01	0.01	0.5
Cyanide	CCNFUR	0.001	0.001	0.001
Lead	PBUT	0.03	0.03	0.5
Magnesium	MGUT	0.01	0.01	0.5
Mercury (µg/L)	HGUT	0.01	0.01	0.01
Molybdenum	MOUT	0.01	0.01	0.25
Nickel	NIUT	0.01	0.01	3
Selenium	SEUT	0.03	0.03	1
Silver	AGUT	0.01	0.01	0.5
Strontium	SRUT	0.01	0.01	0.5
Zinc	ZNUT	0.02	0.02	0.5

5.1.2 Method Blank Results

As previously noted in Section 3, one method blank with each batch of samples was routinely analyzed at each contract laboratory performing organics analyses. The results were used to establish the background contamination or "noise level" of each contaminant.

At the end of each day, the arithmetic mean of the compound concentration for each compound was calculated, and subtracted for the compound concentration measured in each sample for that day. This calculation was made to correct samples for the background "noise level".

When the analyses had been completed for all samples for a specific stream type, the arithmetic mean and standard deviation for the concentrations of each contaminant in the method blanks were calculated.

Since the "noise level" varied from day to day, MOE LSB staff felt that the "noise level" averaged over the duration of the study would be representative of the contamination problem with the compound in question, while the "noise level" established for each analytical run may not have been representative of that particular run. For this purpose, MOE established a criterion to determine if the "noise" level was too high to use the sample analytical data with confidence. If twice the standard deviation of the method blank results was greater than the analytical result for a compound averaged for a particular stream type, then the background concentration was considered too high, the entire analytical results for that compound were not considered valid and the compound was excluded from the data presentation for that stream types. Table 5-2(a) presents the compounds detected in 5 percent or more of the laboratory blank samples analyzed. Table 5-2(b) presents a list of the contaminants that did not meet the blank criterion, and are subsequently excluded from further result presentation.

5.1.3 Field Blank Results

There were a total of 19 field blank samples analyzed, including 8 for volatile organic compounds, 9 for base-neutral and acid extractable compounds and pesticide/herbicide compounds and 2 for dioxin/furan compounds. The field blanks were analyzed for all of the target compounds in each group.

Table 5-3 presents the contaminants identified in field blanks.

Table 5-2(a)
CONTAMINANTS DETECTED IN METHOD BLANK SAMPLES

Compound	Average Concentration (µg/L)	Standard Deviation (µg/L)	No. of Samples Analyzed	No of Times Times Compound was Detected
Di-n-butyl phthalate	1.5	2.8	75	49
Bis-2-Ethylhexyl phthalate	47.7	84.8	75	70
Di-n-octyl phthalate	0.2	0.9	75	6
Di-ethyl phthalate	0.3	1.7	75	7
Methylene chloride	9	6	73	66
Chloroform	3	3	73	29
Toluene	3	5	73	43
Benzene	4	3	73	42
Hexane	7	11	73	40
Bromodichloromethane	3	1	73	9
Methoxychlor	0.08	0.03	34	3

Table 5-2(b)
CONTAMINANTS WITH INVALID ANALYTICAL RESULTS DUE TO METHOD BLANK RESULTS

Contaminant		Sample Types						
Code	Name	Raw Sewage	Primary Effluent	Lagoon Effluent	Secondary Effluent	Tertiary Effluent	Raw Sludge	Treated Sludge
X1CHLO	Chloroform		X		X	X		
B1HEXA	Hexane		X	X	X		X	X
B2BENZ	Benzene		X	X	X		X	X
X1BDCM	Bromodichloromethane		X		X			
B2TOLU	Toluene		X	X	X		X	X
PMPEHP	Bis-2-Ethylhexyl phthalate	X	X	X	X		X	X
PMDNBP	Di-n-butyl phthalate		X	X	X		X	X
PMDNOP	Di-n-octyl phthalate		X	X			X	
PMDEP	Diethyl phthalate			X	X		X	
X1DCLM	Dichloromethane		X	X	X		X	X
P1PMDT	Methoxychlor		X		X			

Notes: X - indicates that the data for the contaminant in the indicated sample type did not meet study QA/QC criteria and was therefore deleted from subsequent evaluation.

Table 5-3
CONTAMINANTS DETECTED IN FIELD BLANKS

Compound Group	Parameter	Concentrations	Frequency
Base-neutral and acid extractables	Di-n-butyl phthalate	3.2 µg/L	1/9 samples
Pesticides/ Herbicides	Methoxychlor	0.1 µg/L, 0.1 µg/L	2/9 samples
	Endosulphan Sulphate	0.09 µg/L	1/9 samples
	2,4-Dichlorophenoxy-acetic acid	0.04 µg/L	1/9 samples
Volatiles	Hexane	13.0 µg/L	1/8 samples

Only 5 organic compounds were detected in the field blanks at concentrations greater than the DLs and in a maximum of 22 percent of tested samples. No dioxin compounds were detected in field blanks.

It was concluded from the field blank results that the level of contamination introduced from the field equipment field sample handling methods and sample transport was not significant.

5.1.4 Results of Duplicate Analyses

Duplicate analyses were carried out in each analytical laboratories in order to determine the variability of the sample results. These results are presented in detail in the individual laboratory reports (Ref. 4).

In a large percentage of the duplicate analyses carried out, one or both of the aliquots results were below the DL and comparisons could not be made. Since there were so few usable duplicate results, the analytical variability as evaluated using these results was inconclusive.

5.1.5 Surrogate Spike Recoveries

Deuterated compounds were added as surrogate spikes to each sample analyzed for volatile and base/neutral acid extractable compounds. Bromofluorobenzene was also added in the spike mixture for volatiles analysis. For dioxin and furan analyses C^{12} labelled tetra and octa dioxin congenors were spiked into the samples. No surrogate spikes were added to samples for pesticide/herbicide analysis since mass spectrometry was not employed for the analysis of these compounds.

Table 5-4(a) - Table 5-4(c) summarize the recoveries of the surrogates by sample type. The summary results show that recoveries of the same surrogate compound in each sample type are very similar (no statistically significant difference at 95% confidence level). Consequently, it was concluded that there was no significant effects of the stream type during this study and the compound recoveries obtained in the blank water spike samples could be used as an indication of average recoveries for all sample types.

Table 5-4(a)
BASE/NEUTRAL COMPOUND SURROGATE RECOVERY SUMMARY BY STREAM TYPE

	Surrogate Compound				
	d_5-phenol	d_4-nitrophenol	d_8-naphthalene	d_{10}-anthracene	d_{12}-benzo-a-pyrene
Raw Sewage					
Average	38%	71%	72.7%	110.3	89.2
Std. dev.	5.4%	15.6%	14.8%	19.7%	14.3%
No. of data averaged*	280	280	280	280	280
Primary Effluent					
Average	38.6%	71.0%	70%	107%	90.5%
Std. dev.	6.3	13.5%	16.8%	15.5%	16.7%
No. of data averaged*	37	37	37	37	37
Secondary Effluent					
Average	37%	71%	67.9%	102.5%	90.5%
Std. dev.	5.2%	15.6%	12.4%	19.2%	15.9%
No. of data averaged*	280	280	280	280	280
Sludges					
Average	52%	70%	72.6%	112.7%	80.5%
Std. dev.	10.9%	18.2%	17.8%	29.2%	17.8%
No. of data averaged*	117	117	117	117	117
Method Blank					
Average	36%	68%	73%	89%	89%
Std. dev.	22%	29%	30%	30%	30%
No. of data averaged*	72	72	72	72	72

Notes: * - No surrogate data were rejected in any case

Table 5-4(b)
DIOXIN/FURAN COMPOUND SURROGATE RECOVERY BY SAMPLE TYPE

Sample Type	13C12-T4CDD Average % Rec.	13C12-T4CDD Std. Dev. %	13C12-T4CDD No. of data averaged	13C12-T4CDD No. of Data rejected	13C12-08CDD Average % Rec.	13C12-08CDD Std. Dev. %	13C12-08CDD No. of data averaged	13C12-08CDD No. of data rejected
Primary Effluent	60.8	18.9	8	0	64.3	14.7	7	1
Secondary Effluent	51.8	22.4	49	3	66.9	28.3	52	0
Recycle	59.1	14.4	8	2	64.7	20.5	9	1
Raw Sewage	58.4	27.3	54	3	63.6	24.8	57	0
Sludge	78.3	36.8	74	12	72.3	27.9	85	1
Method Blank	56.4	28.4	24	0	65.6	24.3	23	1
Native Spike	36.7	18.5	12	0	48.6	22.2	12	0

Table 5-4(c)
VOLATILE ORGANIC COMPOUND SURROGATE RECOVERY BY SAMPLE TYPE

Sample Type	d4-Dichloroethane Avg.% Rec.	d4-Dichloroethane Std. Dev.%	d4-Dichloroethane No. Averaged	d4-Dichloroethane No. Rejected	Bromofluorobenzene Avg.% Rec.	Bromofluorobenzene Std. Dev.%	Bromofluorobenzene No. Averaged	Bromofluorobenzene No. Rejected	d8-Toluene Avg.% Rec.	d8-Toluene Std. Dev.%	d8-Toluene No. Averaged	d8-Toluene No. Rejected	d5-Chlorobenzene Avg.% Rec.	d5-Chlorobenzene Std. Dev.%	d5-Chlorobenzene No. Averaged	d5-Chlorobenzene No. Rejected
Primary Effluent	97	12	35	1	92	15	33	3	95	13	36	0	93	16	36	0
Secondary Effluent	96	16	225	8	97	16	205	28	94	12	222	11	96	16	225	8
Recycle 103	18	43	1	99	17	37	7	100	11	42	2	102	11	41	3	
Raw Sewage	100	14	212	5	99	16	194	23	100	10	213	4	99	14	208	9
Sludge	104	12	87	7	100	18	83	11	103	11	93	1	103	13	88	6
Native Spike	99	10	26	2	101	13	25	3	98	11	24	4	100	13	28	0
Method Blank	102	14	65	8	96	31	64	9	98	16	66	7	95	20	69	4

(KIR18/285W)

5.1.6 Recovery of Native Spikes from Distilled Water

Tables 5-5(a) to 5-5(d) present summaries of the native spike recoveries from distilled water samples for each compound group. Where no data is presented, spiking of the compound in question was not done.

A system was established by the MOE to use the analytical QA/QC results to identify the qualitative and quantitative applicability of the analytical results. Each contaminant was given a code, which was used to label the value of the result in qualitative and quantitative terms. The codes describe recovery criteria, based on spiking of a native compound into a distilled water sample. If spiking of this native compound was not done, the code used was based on historical recovery data from MOE LSB.

The QA/QC codes and associated recovery criteria, as established by the MOE, are:

QA/QC Code	Recovery Criteria
1	The average recovery of the native compound in distilled water samples was within 50 and 150 percent inclusive, and 70 percent or more of individual recovery data were within 50 and 150 percent.
2	The average recovery of the native compound in distilled water samples and individual percent recovery data do not fit the criteria for 1, 3, 4 and 5.
3	The average recovery of the native compound in distilled water samples is either less than 30 percent, or, more than 30 percent of individual recovery data are less than 30 percent.
4	The average recovery in distilled water samples is greater than 150 percent, or, more than 30 percent of individual percent recovery data are greater than 150 percent.
5	More than 30 percent of individual recovery data are less than 30 percent, and, more than 30 percent of individual recovery data are greater than 150 percent.
0	Analyzed by MOE LSD using internal QA/QC procedures

TABLE 5-5a)
SUMMARY OF RECOVERY OF NATIVE BASE/NEUTRAL AND ACID EXTRACTABLE COMPOUND SPIKES FROM
FROM DISTILLED WATER SAMPLES

Compound Code	Compound Name	% Recovery Data Obtained In Distilled Water Samples Spiked With Native Compounds									QA Code
		AVG. % R	STD. DEV OF % R	# DATA	# USED DATA	% USED DATA	# DATA <30% REC	% DATA <30% REC	# DATA >150% REC	% DATA >150% REC	
X3245	2,4,5-TRICHLOROPHENOL	68.7	22.5	71	52	73.2	1	1.4	0	0.0	1
X3246	2,4,6-TRICHLOROPHENOL	83.0	16.0	68	66	97.1	0	0.0	0	0.0	1
PM24DP	2,4-DICHLOROPHENOL	75.6	21.6	68	64	94.1	2	2.9	0	0.0	1
PM24MP	2,4-DIMETHYLPHENOL	57.0	25.0	68	43	63.2	10	14.7	0	0.0	2
PM24NP	2,4-DINITROPHENOL			0							3
PM24DT	2,4-DINITROTOLUENE	96.0	16.0	68	68	100.0	0	0.0	0	0.0	1
PM26DT	2,6-DINITROTOLUENE	89.0	16.0	68	67	98.5	0	0.0	0	0.0	1
X30010	2-CHLOROPHENOL	67.0	22.0	68	50	73.5	3	4.4	0	0.0	1
PM46DP	2-METHYL4,6-DINITROPHENOL	98.0	66.0	68	33	48.5	15	22.1	16	23.5	2
PM2NP	2-NITROPHENOL	76.0	21.0	68	61	89.7	0	0.0	0	0.0	1
PM4BPE	4-BROMOPHENYLPHENYLETHER	86.0	17.0	68	66	97.1	0	0.0	0	0.0	1
PM4CPE	4-CHLOROPHENYLPHENYLETHER	83.0	18.0	68	64	94.1	0	0.0	0	0.0	1
PM4NP	4-NITROPHENOL	47.0	19.0	68	32	47.1	11	16.2	0	0.0	2
PMACNE	ACENAPHTHENE	81.0	17.0	68	66	97.1	0	0.0	0	0.0	1
PMACNY	ACENAPHTHYLENE	84.0	19.0	68	65	95.6	0	0.0	0	0.0	1
PMANAA	ALPHA-NAPHTHYLAMINE	74.0	41.0	68	47	69.1	7	10.3	3	4.4	1
P2AMET	AMETRYNE	89.0	16.0	68	66	97.1	0	0.0	0	0.0	1
PMANTH	ANTHRACENE	89.0	15.0	68	67	98.5	0	0.0	0	0.0	1
P2ATRA	ATRAZINE	104.0	42.0	68	55	80.9	3	4.4	9	13.2	1
PMBAA	BENZO(a)ANTHRACENE	86.0	21.0	68	65	95.6	0	0.0	0	0.0	1
PMBAP	BENZO(a)PYRENE	83.5	16.8	71	68	95.8	1	1.4	1	1.4	1
PMBBFA	BENZO(b)FLUORANTHENE	86.0	22.0	68	65	95.6	0	0.0	1	1.5	1
PMGHIP	BENZO(g,h,i)PERYLENE	81.0	25.0	68	60	88.2	0	0.0	1	1.5	1
PMBKF	BENZO(k)FLUORANTHENE	84.0	19.0	68	64	94.1	0	0.0	1	1.5	1
PMBNAA	Beta-NAPHTHYLAMINE	72.0	29.0	68	49	72.1	3	4.4	0	0.0	1
PMBIPH	BIPHENYL	79.0	17.0	68	66	97.1	0	0.0	0	0.0	1
PMB2EM	Bis(2-CHLOROETHOXY) METHANE	73.0	20.0	68	62	91.2	0	0.0	0	0.0	1
PMB2IE	Bis(2-CHLOROIPROPYL) ETHER	71.0	24.0	68	53	77.9	1	1.5	0	0.0	1
PMBEHP	Bis-2-ETHYLHEXYLPHTHALATE	192.0	133.0	68	36	52.9	0	0.0	31	45.6	4
PMB2ME	Bis-(2-CHLOROMETHYL) ETHER			0							2
PMBBP	BUTYLBENZYLPHTHALATE	91.0	24.0	68	66	97.1	0	0.0	1	1.5	1
PM2CNA	CHLORONAPHTHALENE	76.0	23.0	68	63	92.6	3	4.4	0	0.0	1
PMCHRY	CHRYSENE	87.0	22.0	68	64	94.1	0	0.0	1	1.5	1
P4DIAZ	DIAZINON	90.0	22.0	68	63	92.6	0	0.0	0	0.0	1
PMDAHA	DIBENZO(a,h)ANTHRACENE	81.0	19.0	68	64	94.1	0	0.0	0	0.0	1
PODICH	DICHLORAN	91.0	17.0	68	67	98.5	0	0.0	1	1.5	1
PMDEP	DIETHYL PHTHALATE	96.0	30.0	68	65	95.6	0	0.0	2	2.9	1
PMDMP	DIMETHYL PHTHALATE	90.0	18.0	68	66	97.1	0	0.0	0	0.0	1
PMDPE	DIPHENYL ETHER	79.0	17.0	68	65	95.6	0	0.0	0	0.0	1
PMDNBP	DI-N-BUTYLPHTHALATE	91.0	20.0	68	66	97.1	0	0.0	0	0.0	1
PMDNOP	DI-N-OCTYLPHTHALATE	93.0	23.0	68	66	97.1	0	0.0	1	1.5	1
PMFLAN	FLUORANTHENE	87.0	16.0	68	67	98.5	0	0.0	0	0.0	1
PMFLUO	FLUORENE	85.0	15.0	68	67	98.5	0	0.0	0	0.0	1
PMINP	IDENO(1,2,3-cd)PYRENE	81.0	20.0	68	63	92.6	0	0.0	0	0.0	1
P4MALA	MALATHION	92.0	15.0	68	68	100.0	0	0.0	0	0.0	1
P4MPAR	METHYLPARATHION	91.0	18.0	68	67	98.5	0	0.0	0	0.0	1
PMMCRE	M-CRESOL	77.0	30.0	71	57	80.3	3	4.2	3	4.2	1
PMNAPH	NAPHTHALENE	76.3	19.1	71	68	95.8	2	2.8	0	0.0	1
PMNITB	NITROBENZENE	74.9	22.2	71	59	83.1	3	4.2	0	0.0	1
PMDND	N-NITROSODIPHENYLAMINE	90.0	17.0	68	66	97.1	0	0.0	0	0.0	1
PMDNP	N-NITROSODI-NPROPYLAMINE	79.3	29.7	71	58	81.7	6	8.5	2	2.8	1
PMOCRE	O-CRESOL	41.0	19.0	68	19	27.9	20	29.4	0	0.0	2
P4EPAR	PARATHION ETHYL	91.0	19.0	68	66	97.1	0	0.0	1	1.5	1
X3PCPH	PENTACHLOROPHENOL	65.8	42.3	71	51	71.8	19	26.8	1	1.4	1
PMPHEN	PHENANTHRENE	88.0	17.0	68	65	95.6	0	0.0	0	0.0	1
PMPHEN	PHENOL	40.0	15.0	68	17	25.0	19	27.9	0	0.0	2
PMPYR	PYRENE	87.0	17.0	68	67	98.5	0	0.0	0	0.0	1
PMPCMC	P-CHLORO-M-CRESOL	86.0	17.0	68	66	97.1	0	0.0	0	0.0	1
PMPCRE	P-CRESOL	1.0	7.0	68	1	1.5	67	98.5	0	0.0	3
POTOC	TRI-O-CRESYL PHOSPHATE	92.0	25.0	68	66	97.1	0	0.0	0	0.0	1

TABLE 5-5b)
SUMMARY OF RECOVERY OF NATIVE DIOXIN/FURAN COMPOUND SPIKES FROM DISTILLED WATER SAMPLES

	Compound Name	% Recovery Data Obtained in Distilled Water Samples Spiked With Native Compounds									QA Code
		AVG. % R	STD. DEV. OF % R	DATA	USED DATA	% USED DATA	DATA <30% REC	% DATA <30% REC	DATA >150% REC	% DATA >150% REC	
P97CDD	HEPTACHLORODIBENZODIOXIN	79.0	26.7	12	10	83.3	0	0.0	0	0	1
P97CDF	HEPTACHLORODIBENZOFURAN	101.0	39.7	12	11	91.7	0	0.0	1	8.33	1
P96CDD	HEXACHLORODIBENZODIOXIN	62.0	21.5	12	8	66.7	0	0.0	1	8.33	2
P96CDF	HEXACHLORODIBENZOFURAN	86.0	28.9	12	11	91.7	0	0.0	0	0	1
P98CDD	OCTACHLORODIBENZODIOXIN	83.0	36.8	12	10	83.3	0	0.0	0	0	1
P98CDF	OCTACHLORODIBENZOFURAN	78.0	26.4	12	11	91.7	0	0.0	0	0	1
P95CDD	PENTACHLORODIBENZODIOXIN	62.0	21.5	12	8	66.7	0	0.0	0	0	2
P95CDF	PENTACHLORODIBENZOFURAN	71.0	24.7	12	11	91.7	0	0.0	0	0	1
P94CDD	TETRACHLORODIBENZODIOXIN	66.0	21.9	12	10	83.3	1	8.3	0	0	1
P94CDF	TETRACHLORODIBENZOFURAN	54.0	31.4	12	7	58.3	2	16.7	0	0	2

TABLE 5-5c)
SUMMARY OF RECOVERY OF NATIVE PESTICIDE/HERBICIDE COMPOUND SPIKES FROM DISTILLED WATER SAMPLES

Compound Code	Compound Name	% Recovery Data Obtained In Distilled Water Samples Spiked With Native Compounds									QA Code
		AVG. % R	STD. DEV. OF % R	DATA	USED DATA	% USED DATA	DATA <30% REC	% DATA <30% REC	DATA >150% REC	% DATA >150% REC	
X2124	1,2,4-TRICHLOROBENZENE	27.8	18.4	63	31	49.2	13	20.6	0	0.00	3
P2345T	2,4,5-TRICHLOROPHENOXYACETIC ACID	13.0	45.8	46	1	2.2	45	97.8	0	0.00	3
P24D	2,4-DICHLOROPHENOXYACETIC ACID	2.4	4.9	46	1	2.2	45	97.8	0	0.00	3
P1ALDR	ALDRIN	80.6	87.4	63	54	85.7	8	12.7	0	0.00	1
P1BHCA	Alpha-BHC	77.8	32.1	63	50	79.4	4	6.3	1	1.59	1
P1CHLA	Alpha-CHLORDANE	85.8	39.2	61	50	82.0	4	6.6	3	4.92	1
P1BHCB	Beta-BHC	76.3	30.0	63	52	82.5	4	6.3	1	1.59	1
P0CAPN	CAPTAN	57.0	59.1	48	21	43.8	18	37.5	1	2.08	3
P1BHCD	Delta-BHC	72.9	40.6	62	43	69.4	11	17.7	1	1.61	1
P1DIEL	DIELDRIN	64.7	39.1	55	32	58.2	14	25.5	1	1.82	2
P1ENDA	ELDRIN ALDEHYDE	48.6	29.8	21	8	38.1	6	28.6	0	0.00	2
P1END1	ENDOSULFAN I	66.4	44.1	55	34	61.8	17	30.9	4	7.27	3
P1END2	ENDOSULFAN II	52.2	37.2	62	41	66.1	21	33.9	0	0.00	3
P1ENDS	ENDOSULFAN SULPHATE	55.8	40.7	65	37	56.9	20	30.8	0	0.00	3
P1ENDR	ENDRIN	55.3	40.8	62	31	50.0	23	37.1	1	1.61	3
P1BHCG	Gamma-BHC	65.8	33.0	62	41	66.1	10	16.1	1	1.61	2
P1CHLG	Gamma-CHLORDANE	84.6	41.7	62	48	77.4	10	16.1	3	4.84	1
P1HEPT	HEPTACHLOR	20.3	19.5	63	5	7.9	50	79.4	0	0.00	3
P1HEPE	HEPTACHLOREPOXIDE	63.8	38.2	57	35	61.4	16	28.1	1	1.75	2
X2HCB	HEXACHLOROBENZENE	64.8	27.1	63	40	63.5	6	9.5	1	1.59	2
X1HCBD	HEXACHLOROBUTADIENE	29.7	14.5	62	3	4.8	29	46.8	0	0.00	3
X1HCCP	HEXACHLOROCYCLOPENTADIENE	42.3	44.4	43	10	23.3	23	53.5	3	6.98	3
X2HCE	HEXACHLOROETHANE	28.3	13.2	63	2	3.2	34	54.0	0	0.00	3
P1DMDT	METHOXYCHLOR	57.8	35.7	60	46	76.7	17	28.3	1	1.67	1
P1MIRX	MIREX	63.0	51.0	63	51	81.0	4	6.3	0	0.00	1
P1PMIR	MIREX PHOTO	64.0	41.1	61	33	54.1	17	27.9	1	1.64	2
P1OCHL	OXYCHLORDANE	84.7	50.8	62	37	59.7	8	12.9	8	12.90	2
P1PCBT	PCB, TOTAL			0							2
P0PCNB	PCNB	65.5	27.1	58	39	67.2	5	8.6	1	1.72	2
P1PPDD	PP-DDD	90.4	47.2	62	46	74.2	9	14.5	7	11.29	1
P1PPDE	PP-DDE	78.7	37.9	59	43	72.9	7	11.9	2	3.39	1
P1PPDT	PP-DDT	63.8	65.1	62	34	54.8	21	33.9	7	11.29	3
P3SILV	SILVEX	4.9	9.7	46	0	0.0	44	95.7	0	0.00	3
P1STRO	STROBANE			0							3
P1TOX	TOXAPHENE			0							3

TABLE 5-5d)
SUMMARY OF RECOVERY OF NATIVE VOLATILE ORGANIC COMPOUND SPIKES FROM DISTILLED WATER SAMPLES

Compound Code	Compound Name	% Recovery Data Obtained in Distilled Water Samples Spiked With Native Compounds									QA Code
		AVG. % R	STD. DEV. OF % R	# DATA AVE.	# USED DATA	% USED DATA	# DATA <30% REC	% DATA <30% REC	# DATA >150% REC	% DATA >150% REC	
X1111T	1,1,1-TRICHLOROETHANE	87.0	24.0	28	25	89.28	1	3.6	0	0.0	1
X11122	1,1,2,2-TETRACHLOROETHANE	80.0	19.0	27	26	96.29	0	0.0	0	0.0	1
X1112T	1,1,2-TRICHLOROETHANE	86.0	27.0	28	24	85.71	1	3.6	1	3.6	1
X111CE	1,1-DICHLOROETHANE	92.0	25.0	27	23	85.18	0	0.0	2	7.4	1
X1DCLE	1,1-DICHLOROETHENE	84.0	23.0	26	24	92.30	0	0.0	0	0.0	1
X212CB	1,2-DICHLOROBENZENE	91.0	44.0	27	24	88.88	0	0.0	1	3.7	1
X112CE	1,2-DICHLOROETHANE	84.0	22.0	27	25	92.59	1	3.7	0	0.0	1
X112CP	1,2-DICHLOROPROPANE	91.0	22.0	27	26	96.29	0	0.0	0	0.0	1
X213CB	1,3-DICHLOROBENZENE	89.0	23.0	27	26	96.29	0	0.0	0	0.0	1
X214CB	1,4-DICHLOROBENZENE	91.0	22.0	27	26	96.29	0	0.0	0	0.0	1
B1OCTE	1-OCTENE	95.0	32.0	25	23	92	0	0.0	2	8.0	1
PM2CEE	2-CHLOROETHYLVINYLETHER	89.0	28.0	17	16	94.11	0	0.0	1	5.9	1
X2CPPE	3-CHLOROPROPENE	88.0	49.0	26	19	73.07	1	3.8	3	11.5	1
X23CTO	3-CHLOROTOLUENE	89.0	11.0	19	18	94.73	0	0.0	0	0.0	1
X1ACRO	ACROLEIN										3
X1ACRY	ACRYLONITRILE										3
X1ACTO	Alpha-CHLOROTOLUENE	82.0	24.0	18	16	88.88	2	11.1	0	0.0	1
B2BENZ	BENZENE	101.0	42.0	27	23	85.18	1	3.7	3	11.1	1
B2BDCL	BROMODICHLOROBENZENE	83.0	18.0	12	11	91.66	0	0.0	0	0.0	1
X1BDCM	BROMODICHLOROMETHANE	86.0	23.0	28	25	89.28	0	0.0	0	0.0	1
X1BETH	BROMOETHANE	79.0	18.0	25	24	96	0	0.0	0	0.0	1
BRFLB	BROMOFLUOROBENZENE										2
X1BROM	BROMOFORM	83.0	19.0	28	28	100	0	0.0	0	0.0	1
X1CTET	CARBON TETRACHLORIDE	79.0	25.0	27	23	85.18	0	0.0	1	3.7	1
X2CBEN	CHLOROBENZENE	88.0	16.0	28	27	96.42	0	0.0	0	0.0	1
X1CDBM	CHLORODIBROMOMETHANE	93.0	19.0	28	26	92.85	0	0.0	0	0.0	1
X1CHLE	CHLOROETHANE	89.0	40.0	14	11	78.57	0	0.0	1	7.1	1
X1CHLO	CHLOROFORM	99.0	35.0	28	25	89.28	0	0.0	3	10.7	1
X1CHLM	CHLOROMETHANE	86.0	60.0	17		0	2	11.8	3	17.6	2
X1CDCE	Cis-1,2-DICHLOROETHYLENE	88.0	19.0	26	25	96.15	0	0.0	0	0.0	1
X113DP	Cis-1,3-DICHLOROPROPENE	87.0	19.0	26	25	96.15	0	0.0	0	0.0	1
X1DCFM	DICHLORODIFLUOROMETHANE	79.0	37.0	21	13	61.90	1	4.8	1	4.8	2
X1DCLM	DICHLOROMETHANE	100.0	37.0	28	23	82.14	1	3.6	3	10.7	1
E1DIEE	DIETHYL ETHER	97.0	27.0	24	24	100	0	0.0	0	0.0	1
B2EBNZ	ETHYLBENZENE	93.0	16.0	28	27	96.42	0	0.0	0	0.0	1
B1HEXA	HEXANE	103.0	43.0	28	21	75	0	0.0	4	14.3	1
L1HEX	HEXANOL	66.0	20.0	3	2	66.66	0	0.0	0	0.0	2
B2MPXY	M-, and P-XYLENES	94.0	16.0	26	26	100	0	0.0	0	0.0	1
B2OXYL	O-XYLENE	95.0	20.0	20	20	100	0	0.0	0	0.0	1
B2STYR	STYRENE	91.0	12.0	19	19	100	0	0.0	0	0.0	1
X1TETR	TETRACHLOROETHYLENE	91.0	20.0	27	26	96.29	0	0.0	0	0.0	1
B2TOLU	TOLUENE	96.0	26.0	28	26	92.85	0	0.0	1	3.6	1
X113DR	Trans-1,3-DICHLOROPROPENE	100.0	32.0	24	23	95.83	0	0.0	2	8.3	1
X1TRIC	TRICHLOROETHYLENE	87.0	23.0	27	26	96.29	1	3.7	0	0.0	1
X1TCFM	TRICHLOROFLUOROMETHANE	85.0	22.0	21	21	100	0	0.0	0	0.0	1
X1T12D	TR-1,2-DICHLOROETHYLENE	82.0	28.0	20	18	90	0	0.0	0	0.0	1
B1VBR	VINYL BROMIDE	77.0	24.0	21	20	95.23	0	0.0	0	0.0	1
X1VCL	VINYL CHLORIDE	64.0	45.0	11	5	45.45	1	9.1	1	9.1	2

The above QA/QC codes were used by the MOE to evaluate the applicability of the data, as follows:

QA/QC Code	Data Application
0, 1	Result can be used quantitatively.
2	The result can be used to confirm either the presence or absence of the contaminant, but may not be used quantitatively.
3	If the compound was detected in a sample stream, its presence can be confirmed and the reported concentration is a minimum. However, if it was not detected, its absence cannot be confirmed.
4	If the compound was not detected in a sample stream its absence can be confirmed. However, if it was detected, its presence cannot be confirmed.
5	Neither the absence nor presence of the compound detected or not detected in a sample stream can be confirmed, ie. no conclusions may be made.

The above criteria were applied to all of the contaminants analyzed. The majority of contaminants fell into criteria 1, 2 and 3. Only one contaminant (bis-2-ethylhexyl phthalate) fell into criteria 4 and the results for this compound were previously invalidated using the method blank criterion. There were no contaminants which fell into criteria 5.

5.1.7 MOE LSB Spiking

Duplicate samples were sent from the field to MOE LSB for native compound spiking before being sent to the contract laboratory for analysis, as described in Section 3.2.

The results from these tests were used for observation purposes and were not used for quality control or quality assurance purposes in this study. These results are presented in a separate report by the MOE LSB (Ref. 6).

5.2 Individual WPCP Reports

5.2.1 Background Data

Individual plant background data that was collected for the study included plant historical (1981 - 1985) performance summaries, raw water sources and estimated quantities, pre-monitoring operational data and design information.

Appendix A contains a sub-appendix for each plant in the study, containing (where available) the above background data.

5.2.2 Sampling Program Data

The results of the sampling program contaminant analyses were summarized in individual reports prepared for each plant. Each individual plant report consists of a number of tables, one for each stream sampled at the plant, including raw sewage, final effluent (primary, secondary or lagoon), raw sludge and treated sludge. If there was a recycle stream, an additional table presents this analytical data. Also, the raw sewage results presented are after the recycle contribution in terms of flows and contaminant concentrations has been subtracted.

The individual plant tables for each stream summarize the analytical data for each compound using the following parameters:

- Compound name
- Compound code
- QA/QC code (Section 5.1.2)
- Number of samples analyzed
- Number of samples where compound was detected
- The frequency of detection of the compound in all samples analyzed
- The maximum concentrations analyzed

In addition, two statistical parameters describe the results; the geometric mean and spread factor. For the purpose of calculating the geometric mean and spread factor in cases where the analytical result was below the associated DL, the value below the DL was assumed to be one half of the DL.

For purposes of comparison, individual plant analytical summary tables include results for all of the plants (global) for a specific stream type.

The individual plant reports containing summary analytical data table for each stream are presented in Appendix A.

5.3 Summary of Sampling Program Results

5.3.1 Data Presentation

In order to satisfy the objectives of this study, it was necessary to summarize the analytical data on a combined WPCP or global level.

The global data base for a particular sample type was made up of all the data obtained from the analysis of all relevant samples at all WPCPs. For the purposes of these summaries, each sample (24 hour composite or 5 day composite) was considered independent of the number of samples taken at the plant or the number of sampling periods at the plant.

A global summary table was prepared for each of the following sample types:

- Raw sewage (corrected for the effects of included recycle streams)
- Primary effluent
- Secondary effluent
- Lagoon effluent
- Tertiary effluent
- Raw sludges
- Treated sludges

Each table includes the following:

- Compound code
- Compound name
- QA/QC Code (Section 5.1.2)
- Number of samples analyzed for the compound
- Number of samples in which the compound was detected
- The frequency of detection of the compound in all samples
- The maximum concentration analyzed
- The minimum concentration above the DL

- The number of plants at which the compound was analyzed
- The plant prevalence ie. the percentage of the total number of plants where the compound was detected in at least one sample

In addition, global geometric means and spread factors were calculated, based on the assumptions described in subsection 5.2.2 for values less than the DL.

Also included in the summary tables for liquid streams (ie. raw sewage and effluents) is the compound DL. As previously discussed, this value occasionally varied during the laboratory analyses within the stream type depending on a number of factors. The DL values presented in the summary tables are the limits for over 90 percent of the samples in a stream type. For approximately 10 percent of the samples the analytical laboratory was able to achieve reliable results below those DLs. This will explain the reason that in some cases the minimum reported concentrations presented are lower than the "typical" DL.

For sludges, the DLs used in analyses were based on the liquid sludge sample analyses. Since the contaminant concentrations presented for sludges are on a dry weight basis, the DLs cannot be used for comparative purposes, and are therefore not presented.

5.3.2 Contaminants Not Detected in Any Sample Type

Table 5-6 lists those compounds that were never detected at concentrations above the DLs in any liquid or sludge sample at any of the 37 WPCPs sampled. The list has been partitioned into compounds that are confirmed as not detected and compounds which on the basis of QA/QC results cannot be confirmed as not detected.

In total, 34 compounds were never detected in any sample type, 4 of these were not confirmed. Of the total number, 17 were base neutral and acid extractable compounds, 13 were volatile organic compounds, 3 were pesticide and herbicide compounds and 1 was Tetrachlorodibenzodioxin. There are no metals on this list.

5.3.3 Summary of Contaminants in Raw Wastewater

Table 5-7(a) presents the compounds that were not detected above the DL in any raw wastewater sample. A total of 59 compounds were not detected, including 4 that were not confirmed. Also indicated in this Table are all compounds that were not detected in any stream type (Table 5-6).

TABLE 5-6 - GLOBAL SUMMARY OF CONTAMINANTS NOT DETECTED IN ANY STREAM

CONFIRMED		NOT CONFIRMED	
CONTAMINANT CODE	CONTAMINANT NAME	CONTAMINANT CODE	CONTAMINANT NAME
	BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS		
P2ATRA	ATRAZINE	PMPCRE	P-CRESOL
P4DIAZ	DIAZINON		
P4EPAR	PARATHION ETHYL		
P4MALA	MALATHION		
P4MPAR	METHYLPARATHION		
PM24NP	2,4-DINITROPHENOL		
PMANAA	ALPHA-NAPHTHYLAMINE		
PMBNAA	Beta-NAPHTHYLAMINE		
PN2CNA	CHLORONAPHTHALENE		
PNACNE	ACENAPHTHENE		
PNDAHA	DIBENZO(a,h)ANTHRACENE		
PNGHIP	BENZO(g,h,i)PERYLENE		
PNINP	IDENO(1,2,3-cd)PYRENE		
PODICH	DICHLORAN		
POTOC	TRI-O-CRESYL PHOSPHATE		
X3245	2,4,5-TRICHLOROPHENOL		
	DIOXINS AND FURANS		
P94CDD	TETRACHLORODIBENZODIOXIN		
	PESTICIDES, HERBICIDES, PCBS		
P1STRO	STROBANE	POCAPN	CAPTAN
		X1HCBD	HEXACHLOROBUTADIENE
	VOLATILES		
B1VBR	VINYL BROMIDE	X1ACRY	ACRYLONITRILE
PM2CEE	2-CHLOROETHYLVINYLETHER		
X11122	1,1,2,2-TETRACHLOROETHANE		
X1112T	1,1,2-TRICHLOROETHANE		
X1BETH	BROMOETHANE		
X1BROM	BROMOFORM		
X1CHLE	CHLOROETHANE		
X1CHLM	CHLOROMETHANE		
X1T12D	TR-1,2-DICHLOROETHYLENE		
X1TCFM	TRICHLOROFLUOROMETHANE		
X1VCL	VINYL CHLORIDE		
X2CPPE	3-CHLOROPROPENE		

TABLE 5-7 a - GLOBAL SUMMARY OF CONTAMINANTS NOT DETECTED IN RAW SEWAGE

CONFIRMED		NOT CONFIRMED	
CONTAMINANT CODE	CONTAMINANT NAME	CONTAMINANT CODE	CONTAMINANT NAME
	METALS AND CYANIDE		
BELT	BERYLLIUM,UNFILT.TOTAL		
	BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS		
P2AMET	AMETRYNE	PMPCRE	P-CRESOL*
P2ATRA	ATRAZINE*		
P4DIAZ	DIAZINON*		
P4EPAR	PARATHION ETHYL*		
P4MALA	MALATHION*		
P4MPAR	METHYLPARATHION*		
PM24DT	2,4-DINITROTOLUENE		
PM24NP	2,4-DINITROPHENOL*		
PMANAA	ALPHA-NAPHTHYLAMINE*		
PMBNAA	BETA-NAPHTHYLAMINE*		
PMDPE	DIPHENYL ETHER		
PN2CNA	CHLORONAPHTHALENE*		
PNACNE	ACENAPHTHENE*		
PNACNY	ACENAPHTHYLENE		
PNANTH	ANTHRACENE		
PNBAP	BENZO(A)PYRENE		
PNBIPH	BIPHENYL		
PNCHRY	CHRYSENE		
PNDAHA	DIBENZO(A,H)ANTHRACENE*		
PNGHIP	BENZO(G,H,I)PERYLENE*		
PNINP	IDENO(1,2,3-CD)PYRENE*		
PODICH	DICHLORAN*		
POTOC	TRI-O-CRESYL PHOSPHATE*		
X3245	2,4,5-TRICHLOROPHENOL*		
	DIOXINS AND FURANS		
P94CDD	TETRACHLORODIBENZODIOXIN*		
P95CDD	PENTACHLORODIBENZODIOXIN		
P95CDF	PENTACHLORODIBENZOFURAN		
P96CDD	HEXACHLORODIBENZODIOXIN		
P96CDF	HEXACHLORODIBENZOFURAN		
P97CDD	HEPTACHLORODIBENZODIOXIN		
P97CDF	HEPTACHLORODIBENZOFURAN		
	PESTICIDES, HERBICIDES, PCBS		
P0PCNB	PCNB	P0CAPN	CAPTAN*
P1ENDA	ELDRIN ALDEHYDE	X1HCBD	HEXACHLOROBUTADIENE*
P1STRO	STROBANE*		
P1TOX	TOXAPHENE		
	VOLATILES		
B1OCTE	1-OCTENE	X1ACRY	ACRYLONITRILE*
B1VBR	VINYL BROMIDE*		
E1DIEE	DIETHYL ETHER		
PM2CEE	2-CHLOROETHYLVINYLETHER*		
X1112Z	1,1,2,2-TETRACHLOROETHANE*		
X1112T	1,1,2-TRICHLOROETHANE*		
X113DR	TRANS-1,3-DICHLOROPROPENE		
X1ACTO	ALPHA-CHLOROTOLUENE		
X1BETH	BROMOETHANE*		
X1BROM	BROMOFORM*		
X1CHLE	CHLOROETHANE*		
X1CHLM	CHLOROMETHANE*		
X1DCFM	DICHLORODIFLUOROMETHANE		
X1T12D	TRI-1,2-DICHLOROETHYLENE*		
X1TCFM	TRICHLOROFLUOROMETHANE*		
X1VCL	VINYL CHLORIDE*		
X213CB	1,3-DICHLOROBENZENE		
X214CB	1,4-DICHLOROBENZENE		
X2CBEN	CHLOROBENZENE		
X2CPPE	3-CHLOROPROPENE*		

* - NOT DETECTED IN ANY STREAM TYPE AT ANY PLANT

A summary of the compounds that were detected in any raw sewage sample (all WPCPs) is presented in Table 5-7(b). A total of 85 organic contaminants, 14 metals and cyanide were detected at least once in raw sewage samples. However, only 7 metals (Al, Sr, Zn, Hg, Cu, Ni and Cr), 2 base neutral and acid extractable compounds (M-cresol and phenol) and two pesticides and herbicides (2,4-Dichlorophenoxyacetic acid and gamma-BHC) were found in the raw sewage streams at more than 50 percent of WPCPs. The most prevalent volatile organic compounds were detected in raw sewage at fewer than 40 percent of the 37 plants, and the most prevalent dioxin/furans at fewer than 11 percent of plants.

All detected volatile compounds, dioxin/furans compounds and all but the 2 pesticides and herbicides and 2 base neutral and acid extractable compounds (mentioned above) were detected in less than 20 percent of the samples. Metals were most frequently detected contaminant group.

5.3.4 Summary of Contaminants in Primary Effluents

Table 5-8(a) presents the contaminants that were not detected in any primary effluent samples from any of the 7 primary treatment plants. There were a total of 109 compounds not detected, including 7 that were not confirmed. Also indicated in the Table are the 34 compounds that were not detected in any sample at any plant.

A summary of the parameters detected in any primary effluent is presented in Table 5-8(b). A total of 33 organic contaminants, 13 metals and cyanide were detected at least once in the primary effluents.

Four of the 6 base neutral and acid extractable compounds, 4 of the 15 pesticides and herbicides, and 4 of 10 volatile organic compounds were detected in at least 3 of the 7 primary WPCPs. Metals were the most prevalent contaminant with 12 metals detected at at least 3 plants. Dioxin/furan compounds were only detected at 2 plants.

As noted, metals were the most frequently detected contaminants. Six metals (Zn, Sr, Hg, Al, Cr, Cu) were detected in greater than 60 percent of all primary effluent samples. Only one base neutral and acid extractable compound (M-cresol) two pesticides and herbicides (gamma-BHC and 2,4-Dichlorophenoxyacetic acid) and 1 volatile organic compound (Tetrachloroethylene) were present at least 40 percent of samples. The most frequently detected dioxin compound (Octachlorodibenzodioxin) was detected in only 25 percent of the samples.

TABLE 5-7b - GLOBAL SUMMARY OF CONTAMINANTS IN RAW SEWAGE

CONTAM-INANT	CONTAMINANT NAME	UNITS	QA/QC CODE	GLOBAL # SAMPS. DET.	GLOBAL # SAMPS. TESTED	GLOBAL % FREQ. DET.	GLOBAL # PLANTS DET.	GLOBAL # PLANTS	GLOBAL % PLANT PREV.	GLOBAL GEO. MEAN	GLOBAL SPREAD FACTOR	GLOBAL MAX. CONC.	GLOBAL MIN. CONC. > DL	DET. LIMIT (DL)
CONVENTIONAL														
DOC	DISSOLVED ORGANIC CARBON	mg/L	0	271	271	100.0	37	37	100.0	22.39	1.81	184.00	1.50	1.00
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0	273	273	100.0	37	37	100.0	25.44	1.47	76.50	1.20	0.10
PH	(-LOG(H+(CONCN))		0	275	275	100.0	37	37	100.0	6.90	1.05	9.27	6.09	1.00
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/L	0	248	248	100.0	30	30	100.0	5.18	1.51	17.90	0.51	0.01
NNHTPR	AMMONIUM,TOTAL FILT.REAC.	mg/L	0	274	275	99.6	37	37	100.0	15.37	1.69	43.10	4.55	0.20
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0	266	267	99.6	37	37	100.0	140.23	1.93	802.00	11.00	1.00
RSP	RESIDUE, PARTICULATE	mg/L	0	266	267	99.6	37	37	100.0	126.88	1.93	667.00	6.10	1.00
COD	CHEMICAL OXYGEN DEMAND	mg/L	0	258	260	99.2	37	37	100.0	287.75	1.82	1620.00	12.00	5.00
RSPLOI	RESIDUE,PARTICLOSS ON IGNI.	mg/L	0	89	90	98.9	18	18	100.0	100.84	1.78	259.00	24.62	0.00
NNO2PR	NITRITE,FILT. REACT.	mg/L	0	58	271	21.4	19	37	51.4	0.01	2.98	0.97	0.01	0.01
PHNOL	PHENOLICS (4AAP)	mg/L	0	37	275	13.5	14	37	37.8	0.31	2.05	16.01	0.58	0.50
NNO3PR	NITRATES,TOTAL FILT.REAC.	mg/L	0	28	275	10.2	12	37	32.4	0.05	2.33	13.40	0.05	0.05
METALS AND CYANIDE														
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	318	319	99.7	37	37	100.0	370.70	2.14	2250.00	60.00	10.00
CUUT	COPPER,UNFILT.TOTAL	ug/L	0	48	49	98.0	34	35	97.1	110.60	2.28	660.00	30.00	10.00
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	315	322	97.8	37	37	100.0	211.00	2.94	5300.00	19.50	20.00
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	274	283	96.8	37	37	100.0	0.23	2.11	1.60	0.02	0.01
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	306	322	95.0	36	37	97.3	1000.10	2.65	22957.80	101.60	20.00
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	237	322	73.6	33	37	89.2	51.10	3.44	820.00	10.00	10.00
NIUT	NICKEL,UNFILT.TOTAL	ug/L	0	103	322	32.0	20	37	54.1	38.80	2.70	1469.90	20.00	10.00
CCNPUR	CYANIDE-FREE,UNFILT.REAC.	ug/L	0	82	271	30.3	12	37	32.4	1.90	6.88	19000.00	3.00	1.00
AGUT	SILVER,UNFILT.TOTAL	ug/L	0	82	321	25.6	28	37	75.7	10.40	2.55	90.00	8.20	10.00
COUT	COBALT,UNFILT.TOTAL	ug/L	0	82	322	25.5	31	37	83.8	9.30	2.31	80.00	4.50	10.00
CDUT	CADMIUM,UNFILT.TOTAL	ug/L	0	76	322	23.6	26	37	70.3	6.50	2.09	259.20	3.00	3.00
PBUT	LEAD,UNFILT.TOTAL	ug/L	0	57	322	17.7	19	37	51.4	59.50	1.86	1203.00	60.00	30.00
MOUT	MOLYBDENUM,UNFILT.TOTAL	ug/L	0	41	321	12.8	21	37	56.8	12.40	1.72	590.00	20.00	10.00
SEUT	SELENIUM,UNFILT.TOTAL	ug/L	0	5	308	1.6	2	37	5.4	17.30	2.07	90.00	30.00	30.00
ASUT	ARSENIC,UNFILT.TOTAL	ug/L	0	3	308	1.0	1	37	2.7	16.80	1.83	60.00	60.00	30.00
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS														
PM4CRE	M-CRESOL	ug/L	1	167	275	60.7	32	37	86.5	25.39	3.45	783.95	0.18	15.00
PMPHEN	PHENOL	ug/L	2	118	275	42.9	29	37	78.4	14.52	2.46	276.20	9.97	15.00
PMBBP	BUTYLBENZYLPHTHALATE	ug/L	1	34	275	12.4	14	37	37.8	5.85	1.66	82.90	10.10	10.00
PMNAPH	NAPHTHALENE	ug/L	1	16	275	5.8	8	37	21.6	5.37	1.47	46.90	10.30	10.00
PMPHEN	PHENANTHRENE	ug/L	1	7	275	2.6	4	37	10.8	5.17	1.35	39.30	2.20	10.00
PM2CRE	O-CRESOL	ug/L	2	6	275	2.2	3	37	8.1	7.72	1.39	216.50	15.30	15.00
X3PCPH	PENTACHLOROPHENOL	ug/L	1	5	275	1.8	4	37	10.8	12.94	1.42	120.80	29.60	25.00
PMDMP	DIMETHYL PHTHALATE	ug/L	1	4	275	1.5	2	37	5.4	5.10	1.37	117.60	10.60	10.00
PMFLAN	FLUORANTHENE	ug/L	1	4	275	1.5	2	37	5.4	5.09	1.29	36.60	2.40	10.00
PM4NP	4-NITROPHENOL	ug/L	2	3	275	1.1	3	37	8.1	12.65	1.29	53.30	32.05	25.00
PMB2EM	BIS(2-CHLOROETHOXY)METHANE	ug/L	1	2	275	0.7	2	37	5.4	5.09	1.38	106.70	47.70	10.00
PMB2NE	BIS-(2-CHLOROMETHYL)ETHER	ug/L	2	2	275	0.7	2	37	5.4	7.61	1.34	101.50	39.40	15.00
PMNNP	N-NITROSO-DI-NPROPYLAMINE	ug/L	1	2	275	0.7	2	37	5.4	5.09	1.37	103.90	39.00	10.00
PM24DP	2,4-DICHLOROPHENOL	ug/L	1	1	275	0.4	1	37	2.7	12.57	1.29	76.80	76.80	25.00
PM24MP	2,4-DIMETHYLPHENOL	ug/L	2	1	275	0.4	1	37	2.7	12.54	1.27	33.90	33.90	25.00
PM26DT	2,6-DINITROTOLUENE	ug/L	1	1	275	0.4	1	37	2.7	7.54	1.28	36.90	36.90	15.00
PM2NP	2-NITROPHENOL	ug/L	1	1	275	0.4	1	37	2.7	12.53	1.26	29.40	29.40	25.00
PM46DP	2-METHYL4,6-DINITROPHENOL	ug/L	2	1	275	0.4	1	37	2.7	12.57	1.29	79.40	79.40	25.00
PM4BPE	4-BROMOPHENYLPHENYLETHER	ug/L	1	1	275	0.4	1	37	2.7	7.58	1.33	181.40	181.40	15.00
PM4CPE	4-CHLOROPHENYLPHENYLETHER	ug/L	1	1	275	0.4	1	37	2.7	5.05	1.33	95.50	95.50	10.00

TABLE 5-7 b - GLOBAL SUMMARY OF CONTAMINANTS IN RAW SEWAGE

CONTAM-INANT	CONTAMINANT NAME	UNITS	QA/QC CODE	GLOBAL # SAMPS. DET.	GLOBAL # SAMPS. TESTED	GLOBAL % FREQ. DET.	GLOBAL # PLANTS DET.	GLOBAL # PLANTS	GLOBAL % PLANT PREV.	GLOBAL GEO. MEAN	GLOBAL SPREAD FACTOR	GLOBAL MAX. CONC.	GLOBAL MIN. CONC. > DL	DET. LIMIT (DL)
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS														
PMB2IE	BIS(2-CHLOROISOPROPYL)ETHER	ug/L	1	1	275	0.4	1	37	2.7	5.05	1.35	124.00	124.00	10.00
PMNITB	NITROBENZENE	ug/L	1	1	275	0.4	1	37	2.7	5.03	1.29	28.96	28.96	10.00
PMNND	N-NITROSO-DI-PHENYLAMINE	ug/L	1	1	275	0.4	1	37	2.7	5.05	1.35	121.60	121.60	10.00
PMPCMC	P-CHLORO-M-CRESOL	ug/L	1	1	275	0.4	1	37	2.7	12.59	1.50	104.70	104.70	25.00
PNBAA	BENZO(A)ANTHRACENE	ug/L	1	1	275	0.4	1	37	2.7	5.03	1.29	37.60	37.60	10.00
PNBBFA	BENZO(B)FLUORANTHENE	ug/L	1	1	275	0.4	1	37	2.7	5.01	1.27	14.00	14.00	10.00
PNBKF	BENZO(K)FLUORANTHENE	ug/L	1	1	275	0.4	1	37	2.7	5.03	1.29	33.30	33.30	10.00
PNFLUO	FLUORENE	ug/L	1	1	275	0.4	1	37	2.7	5.02	1.22	26.50	26.50	10.00
PNPYR	PYRENE	ug/L	1	1	275	0.4	1	37	2.7	7.51	1.26	15.00	15.00	15.00
X30010	2-CHLOROPHENOL	ug/L	0	1	275	0.4	1	37	2.7	12.53	1.26	32.20	32.20	25.00
X3246	2,4,6-TRICHLOROPHENOL	ug/L	1	1	275	0.4	1	37	2.7	12.53	1.26	30.50	30.50	25.00
DIOXINS AND FURANS														
P98CDD	OCTACHLORODIBENZODIOXIN	ng/L	1	4	54	7.4	4	37	10.8	0.87	3.66	28.00	0.73	1.00
P94CDF	TETRACHLORODIBENZOFURAN	ng/L	2	1	54	1.9	1	37	2.7	0.41	3.08	4.80	4.80	0.20
P98CDF	OCTACHLORODIBENZOFURAN	ng/L	1	1	54	1.9	1	37	2.7	0.79	2.87	3.00	3.00	1.00
PESTICIDES,HERBICIDES,PCBS														
P324D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	214	276	77.5	37	37	100.0	0.13	3.72	2.60	0.00	0.04
P1BHCG	GAMMA-BHC(HEXACHLORCYCLOHEXANE)	ug/L	2	143	276	51.8	35	37	94.6	0.02	2.29	2.70	0.01	0.02
P1DMDT	METHOXYCHLOR	ug/L	1	47	276	17.0	16	37	43.2	0.08	3.14	5.90	0.10	0.10
P1PCBT	PCB, TOTAL	ug/L	2	42	276	15.2	17	37	46.0	0.06	2.31	4.50	0.08	0.08
X2124	1,2,4-TRICHLOROBENZENE	ug/L	3	35	276	12.7	15	37	40.5	0.01	2.48	2.26	0.02	0.02
P1BHCB	BHTA-BHC (HEXACHLORCYCLOHEXANE)	ug/L	1	32	276	11.6	13	37	35.1	0.01	1.66	0.13	0.02	0.02
P5SILV	SILVEX	ug/L	3	28	276	10.1	15	37	40.5	0.06	1.68	1.00	0.08	0.10
P245T	2,4,5-TRICLOROPHENOXYACETIC ACID	ug/L	3	22	276	8.0	14	37	37.8	0.06	1.60	0.73	0.07	0.10
P1BHCA	ALPHA-BHC(HEXACHLORCYCLOHEXANE)	ug/L	1	16	276	5.8	7	37	18.9	0.01	1.50	0.10	0.02	0.02
P1PPDE	PP-DDE	ug/L	1	15	276	5.4	9	37	24.3	0.01	1.74	5.80	0.01	0.02
P1ENDS	ENDOSULFAN SULPHATE	ug/L	3	13	276	4.7	6	37	16.2	0.04	1.56	0.99	0.12	0.08
X24CB	HEXACHLOROBENZENE	ug/L	2	11	276	4.0	7	37	18.9	0.01	1.39	0.10	0.02	0.02
P1END2	ENDOSULFAN II	ug/L	3	10	276	3.6	8	37	21.6	0.01	1.42	0.15	0.02	0.02
P1HEPT	HEPTACHLOR	ug/L	3	10	276	3.6	7	37	18.9	0.01	1.48	0.22	0.03	0.02
P1CHLG	GAMMA-CHLORDANE	ug/L	1	9	276	3.3	6	37	16.2	0.01	1.49	2.10	0.02	0.02
P1PPDT	PP-DDT	ug/L	3	9	276	3.3	7	37	18.9	0.04	1.35	0.95	0.08	0.08
P1DIEL	DIELDRIN	ug/L	2	8	276	2.9	7	37	18.9	0.01	1.28	0.04	0.02	0.02
P1CHLA	ALPHA-CHLORDANE	ug/L	1	7	276	2.5	5	37	13.5	0.01	1.46	2.00	0.02	0.02
P1MIRX	MIREX	ug/L	1	6	276	2.2	4	37	10.8	0.01	1.28	0.20	0.02	0.02
P1PPDD	PP-DDD	ug/L	1	6	276	2.2	5	37	13.5	0.01	1.38	0.34	0.02	0.02
P1ENDR	ENDRIN	ug/L	3	5	276	1.8	4	37	10.8	0.01	1.34	0.25	0.03	0.02
X1HCCP	HEXACHLOROCYCLOPENTADIENE	ug/L	3	5	276	1.8	5	37	13.5	0.10	1.30	0.38	0.12	0.20
X2HCE	HEXACHLOROETHANE	ug/L	3	5	276	1.8	5	37	13.5	0.01	1.26	0.09	0.02	0.02
P1END1	ENDOSULFAN I	ug/L	3	4	276	1.5	2	37	5.4	0.01	1.30	0.12	0.03	0.02
P1ALDR	ALDRIN	ug/L	1	3	276	1.1	3	37	8.1	0.01	1.21	0.04	0.02	0.02
P1HEPE	HEPTACHLOREPOXIDE	ug/L	2	2	276	0.7	2	37	5.4	0.01	1.19	0.03	0.02	0.02
P1OCHL	OXYCHLORDANE	ug/L	2	2	276	0.7	2	37	5.4	0.01	1.23	0.06	0.05	0.02
P1BHCD	DELTA-BHC(HEXACHLORCYCLOHEXANE)	ug/L	1	1	276	0.4	1	37	2.7	0.01	1.20	0.05	0.05	0.02
P1PMIR	MIREX PHOTO	ug/L	2	1	276	0.4	1	37	2.7	0.01	1.18	0.03	0.03	0.02

TABLE 5-7b - GLOBAL SUMMARY OF CONTAMINANTS IN RAW SEWAGE

CONTAM-INANT	CONTAMINANT NAME	UNITS	QA/QC CODE	GLOBAL # SAMPS. DET.	GLOBAL # SAMPS. TESTED	GLOBAL % FREQ. DET.	GLOBAL # PLANTS DET.	GLOBAL # PLANTS	GLOBAL % PLANT PREV.	GLOBAL GEO. MEAN	GLOBAL SPREAD FACTOR	GLOBAL MAX. CONC.	GLOBAL MIN. CONC. > DL	DET. LIMIT (DL)
VOLATILES														
B2MPXY	M-, AND P-XYLENES	ug/L	1	43	274	15.7	14	37	37.8	26.00	2.02	1700.00	3.80	40.00
B2EBNZ	ETHYLBENZENE	ug/L	1	30	274	11.0	11	37	29.7	23.50	1.75	1200.00	3.50	40.00
X1CHLO	CHLOROFORM	ug/L	1	28	274	10.2	12	37	32.4	23.90	1.75	340.00	41.00	40.00
B2OXYL	O-XYLENE	ug/L	1	25	274	9.1	9	37	24.3	22.47	1.56	570.00	4.40	40.00
X1111T	1,1,1-TRICHLOROETHANE	ug/L	1	21	274	7.7	7	37	18.9	23.18	1.74	440.00	43.42	40.00
X1TRIC	TRICHLOROETHYLENE	ug/L	1	15	274	5.5	6	37	16.2	22.59	1.82	9800.00	12.00	40.00
X1TETR	TETRACHLOROETHYLENE	ug/L	1	12	274	4.4	7	37	18.9	21.51	1.53	3000.00	29.00	40.00
B2STYR	STYRENE	ug/L	1	9	274	3.3	4	37	10.8	21.40	1.39	1208.08	43.33	40.00
X1DCLE	1,1-DICHLOROETHENE	ug/L	1	7	274	2.6	5	37	13.5	20.55	1.28	220.00	10.00	40.00
B2BDCL	BROMODICHLOROBENZENE	ug/L	1	2	274	0.7	2	37	5.4	20.55	1.12	55.00	40.00	40.00
X112CE	1,2-DICHLOROETHANE	ug/L	1	2	274	0.7	2	37	5.4	20.26	1.17	120.00	120.00	40.00
X1BDCM	BROMODICHLOROMETHANE	ug/L	1	2	274	0.7	2	37	5.4	30.10	1.10	130.00	18.00	60.00
X1CDBM	CHLORODIBROMOMETHANE	ug/L	1	2	274	0.7	2	37	5.4	20.16	1.10	67.00	56.00	40.00
X1CTET	CARBON TETRACHLORIDE	ug/L	1	2	274	0.7	2	37	5.4	20.19	1.12	99.00	57.00	40.00
L1HEX	HEXANOL	ug/L	2	1	274	0.4	1	37	2.7	1368.56	7.09	5000.00	5000.00	5000
X111CE	1,1-DICHLOROETHANE	ug/L	1	1	274	0.4	1	37	2.7	20.19	1.16	250.00	250.00	40.00
X112CP	1,2-DICHLOROPROPANE	ug/L	1	1	274	0.4	1	37	2.7	20.05	1.05	42.00	42.00	40.00
X113DP	CIS-1,3-DICHLOROPROPENE	ug/L	1	1	274	0.4	1	37	2.7	29.24	1.11	40.00	40.00	60.00
X1ACRO	ACROLEIN	ug/L	3	1	274	0.4	1	37	2.7	202.81	1.26	9200.00	9200.00	400.00
X1CDCE	CIS-1,2-DICHLOROETHYLENE	ug/L	1	1	274	0.4	1	37	2.7	20.14	1.12	130.00	130.00	40.00
X212CB	1,2-DICHLOROBENZENE	ug/L	1	1	274	0.4	1	37	2.7	20.05	1.05	42.00	42.00	40.00
X23CTO	3-CHLOROTOLUENE	ug/L	1	1	274	0.4	1	37	2.7	20.51	1.11	44.00	44.00	40.00

TABLE 5-8 a - GLOBAL SUMMARY OF CONTAMINANTS NOT DETECTED IN PRIMARY EFFLUENTS

CONFIRMED		NOT CONFIRMED	
CONTAMINANT CODE	CONTAMINANT NAME	CONTAMINANT CODE	CONTAMINANT NAME
	METALS AND CYANIDE		
ASUT	ARSENIC,UNFILT.TOTAL		
BEUT	BERYLLIUM,UNFILT.TOTAL		
	BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS		
P2AMET	AMETRYNE	PMPCRE	P-CRESOL*
P2ATRA	ATRAZINE*		
P4DIAZ	DIAZINON*		
P4EPAR	PARATHION ETHYL*		
P4MALA	MALATHION*		
P4MPAR	METHYLPARATHION*		
P4O4DP	2,4-DICHLOROPHENOL		
P4O4DT	2,4-DINITROTOLUENE		
P4O4MP	2,4-DIMETHYLPHENOL		
P4O4NP	2,4-DINITROPHENOL*		
P4O6DT	2,6-DINITROTOLUENE		
P4O2NP	2-NITROPHENOL		
P4M4DP	2-METHYL4,6-DINITROPHENOL		
P4O4BPE	4-BROMOPHENYLPHENYLETHER		
P4O4CPE	4-CHLOROPHENYLPHENYLETHER		
P4O4NP	4-NITROPHENOL		
P4AAAA	ALPHA-NAPHTHYLAMINE*		
P4B2EM	BIS(2-CHLOROETHOXY)METHANE		
P4B2EE	BIS(2-CHLOROISOPROPYL)ETHER		
P4B2NE	BIS-(2-CHLOROMETHYL)ETHER		
P4BNAA	BETA-NAPHTHYLAMINE*		
P4DMP	DIMETHYL PHTHALATE		
P4DPE	DIPHENYL ETHER		
P4NTB	NITROBENZENE		
P4NND	N-NITROSO-DI-PHENYLAMINE		
P4NOP	N-NITROSO-DI-NPROPYLAMINE		
P4PCMC	P-CHLORO-M-CRESOL		
P5CNA	CHLORONAPHTHALENE*		
P5ACNE	ACENAPHTHENE*		
P5ACNY	ACENAPHTHYLENE		
P5ANTH	ANTHRACENE		
P5BAA	BENZO(A)ANTHRACENE		
P5BAP	BENZO(A)PYRENE		
P5BBFA	BENZO(B)FLUORANTHENE		
P5BIPH	BIPHENYL		
P5BKF	BENZO(K)FLUORANTHENE		
P5CHRY	CHRYSENE		
P5DAHA	DIBENZO(A,H)ANTHRACENE*		
P5FLAN	FLUORANTHENE		
P5GHIP	BENZO(G,H,I)PERYLENE*		
P5INP	IDENO(1,2,3-CD)PYRENE*		
P5PHEN	PHENANTHRENE		
P5PYR	PYRENE		
P6DICH	DICHLORAN*		
P6TOC	TRI-O-CRESYL PHOSPHATE*		
X3081O	2-CHLOROPHENOL		
X3245	2,4,5-TRICHLOROPHENOL*		
X3246	2,4,6-TRICHLOROPHENOL		
X3PCP6	PENTACHLOROPHENOL		
	DIOXINS AND FURANS		
P4CDD	TETRACHLORODIBENZODIOXIN*		
P5CDD	PENTACHLORODIBENZODIOXIN		
P5CDF	PENTACHLORODIBENZOFURAN		
P6CDD	HEXACHLORODIBENZODIOXIN		
P6CDF	HEXACHLORODIBENZOFURAN		
P7CDD	HEPTACHLORODIBENZODIOXIN		
P7CDF	HEPTACHLORODIBENZOFURAN		
P8CDF	OCTACHLORODIBENZOFURAN		
	PESTICIDES, HERBICIDES, PCBS		
P0PCNB	PCNB	P0CAPN	CAPTAN*
P1ALDR	ALDRIN	P1END1	ENDOSULFAN I
P1BHCD	DELTA-BHC(HEXACHLORCYCLOHEXANE)	P1ENDR	ENDRIN
P1CHLA	ALPHA-CHLORDANE	X1HCBD	HEXACHLOROBUTADIENE*
P1CHLG	GAMMA-CHLORDANE		
P1DIEL	DIELDRIN		
P1ENDA	ELDRIN ALDEHYDE		
P1HEPE	HEPTACHLOREPOXIDE		
P1OCHL	OXYCHLORDANE		
P1PMIR	MIREX PHOTO		

* - NOT DETECTED IN ANY STREAM TYPE AT ANY PLANT

TABLE 5-8 a - GLOBAL SUMMARY OF CONTAMINANTS NOT DETECTED IN PRIMARY EFFLUENTS

CONFIRMED		NOT CONFIRMED	
CONTAMINANT CODE	CONTAMINANT NAME	CONTAMINANT CODE	CONTAMINANT NAME
	PESTICIDES, HERBICIDES, PCBS		
P1PPDD	PP-DDD		
P1PPDE	PP-DDE		
P1STRO	STROBANE*		
P1TOX	TOXAPHENE		
X2HCB	HEXACHLOROBENZENE		
	VOLATILES ORGANIC		
B1VBR	VINYL BROMIDE*	X1ACRO	ACROLEIN
B2BDCL	BROMODICHLOROBENZENE	X1ACRY	ACRYLONITRILE*
E1DIEE	DIETHYL ETHER		
L1HEX	HEXANOL		
PM2CEE	2-CHLOROETHYLVINYLETHER*		
X11122	1,1,2,2-TETRACHLOROETHANE*		
X1112T	1,1,2-TRICHLOROETHANE*		
X111CE	1,1-DICHLOROETHANE		
X112CE	1,2-DICHLOROETHANE		
X112CP	1,2-DICHLOROPROPANE		
X113DP	CIS-1,3-DICHLOROPROPENE		
X113DR	TRANS-1,3-DICHLOROPROPENE		
X1ACTO	ALPHA-CHLOROTOLUENE		
X1BETH	BROMOETHANE*		
X1BROM	BROMOFORM*		
X1CDBM	CHLORODIBROMOMETHANE		
X1CDCE	CIS-1,2-DICHLOROETHYLENE		
X1CHLE	CHLOROETHANE*		
X1CHLM	CHLOROMETHANE*		
X1DCFM	DICHLORODIFLUOROMETHANE		
X1T12D	TRI-1,2-DICHLOROETHYLENE*		
X1TCFM	TRICHLOROFLUOROMETHANE*		
X1VCL	VINYL CHLORIDE*		
X212CB	1,2-DICHLOROBENZENE		
X213CB	1,3-DICHLOROBENZENE		
X214CB	1,4-DICHLOROBENZENE		
X23CTO	3-CHLOROTOLUENE		
X2CBEN	CHLOROBENZENE		
X2CPPE	3-CHLOROPROPENE*		

* - NOT DETECTED IN ANY STREAM TYPE AT ANY PLANT

TABLE 5-8 b - GLOBAL SUMMARY OF CONTAMINANTS IN PRIMARY EFFLUENTS

CONTAM-INANT	CONTAMINANT NAME	UNITS	QA/QC CODE	GLOBAL # SAMPS. DET.	GLOBAL # SAMPS. TESTED	GLOBAL % FREQ. DET.	GLOBAL # PLANTS DET.	GLOBAL # PLANTS	GLOBAL % PLANT PREV.	GLOBAL GEO. MEAN	GLOBAL SPREAD FACTOR	GLOBAL MAX. CONC.	GLOBAL MIN. CONC. > DL	DET. LIMIT (DL)
CONVENTIONAL														
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0	40	40	100.0	7	7	100.0	48.40	2.05	139.00	8.20	1.00
COD	CHEMICAL OXYGEN DEMAND	mg/L	0	40	40	100.0	7	7	100.0	108.54	1.56	376.00	50.00	5.00
DOC	DISSOLVED ORGANIC CARBON	mg/L	0	40	40	100.0	7	7	100.0	12.80	1.40	44.80	8.00	1.00
NNHTFR	AMMONIUM,TOTAL FILT.REAC.	mg/L	0	40	40	100.0	7	7	100.0	10.46	1.66	21.60	2.20	0.20
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0	40	40	100.0	7	7	100.0	15.36	1.30	24.10	8.30	0.01
PH	(-LOG(H+(CONCN))		0	40	40	100.0	7	7	100.0	6.88	1.03	7.44	6.16	1.00
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/L	0	34	34	100.0	5	5	100.0	1.34	1.96	4.02	0.33	0.01
RSP	RESIDUE, PARTICULATE	mg/L	0	39	39	100.0	7	7	100.0	29.57	1.75	111.00	7.30	1.00
RSPLOI	RESIDUE,PAR.LOSS ON IGNI.	mg/L	0	10	10	100.0	2	2	100.0	28.16	1.95	76.80	12.80	0.00
TURB	TURBIDITY	mg/L	0	5	5	100.0	1	1	100.0	17.58	1.35	26.00	11.50	0.25
PHNOL	PHENOLICS (4AAP)	mg/L	0	7	40	17.5	4	7	57.1	0.06	2.01	2.60	0.11	0.10
NNO2FR	NITRITE,FIL.T. REACT.	mg/L	0	4	40	10.0	1	7	14.3	0.00	4.03	0.53	0.15	0.01
NNOTFR	NITRATES,TOTAL FIL.T.REAC.	mg/L	0	4	40	10.0	1	7	14.3	0.05	3.16	1.55	0.90	0.05
METALS AND CYANIDE														
ZNUT	ZINC,UNFILT.TOTAL.	ug/L	0	48	48	100.0	7	7	100.0	69.80	3.04	1300.00	10.00	20.00
SRUT	STRONTIUM,UNFILT.TOTAL.	ug/L	0	47	48	97.9	7	7	100.0	304.90	2.83	1030.00	60.00	10.00
HGUT	MERCURY,UNFILT.TOTAL.	ug/L	0	38	39	97.4	7	7	100.0	0.05	2.42	0.36	0.01	0.01
ALUT	ALUMINUM,UNFILT.TOTAL.	ug/L	0	46	48	95.8	7	7	100.0	550.00	3.45	4800.00	100.00	20.00
CUUT	COPPER,UNFILT.TOTAL.	ug/L	0	7	8	87.5	7	7	100.0	18.20	1.85	60.00	10.00	10.00
CRUT	CHROMIUM,UNFILT.TOTAL.	ug/L	0	29	48	60.4	6	7	85.7	10.80	1.94	40.00	10.00	10.00
CDUT	CADMIUM,UNFILT.TOTAL.	ug/L	0	18	48	37.5	6	7	85.7	2.50	1.96	7.00	3.00	3.00
COUT	COBALT,UNFILT.TOTAL.	ug/L	0	11	48	22.9	6	7	85.7	6.50	1.58	20.00	10.00	10.00
MOUT	MOLYBDENUM,UNFILT.TOTAL.	ug/L	0	11	48	22.9	5	7	71.4	6.60	1.66	20.00	10.00	10.00
NIUT	NICKEL,UNFILT.TOTAL.	ug/L	0	10	48	20.8	4	7	57.1	8.70	2.86	140.00	10.00	10.00
PBUT	LEAD,UNFILT.TOTAL.	ug/L	0	9	48	18.8	5	7	71.4	20.80	1.94	140.00	30.00	30.00
AGUT	SILVER,UNFILT.TOTAL.	ug/L	0	8	48	16.7	4	7	57.1	6.40	1.61	20.00	10.00	10.00
CCNPUR	CYANIDE-FREE,UNFILT.REAC.	ug/L	0	3	40	7.5	3	7	42.9	0.90	2.61	39.00	7.00	1.00
SEUT	SELENIUM,UNFILT.TOTAL.	ug/L	0	1	45	2.2	1	7	14.3	16.50	1.70	30.00	30.00	30.00
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS														
PMOMCRE	M-CRESOL	ug/L	1	18	39	46.2	5	7	71.4	3.90	2.97	32.40	4.30	3.00
PMBBP	BUTYLBENZYLPHTHALATE	ug/L	1	8	39	20.5	4	7	57.1	1.42	2.10	9.20	2.10	2.00
PMPHEN	PHENOL	ug/L	2	5	39	12.8	3	7	42.9	1.78	1.60	8.70	3.40	3.00
PNNAPH	NAPHTHALENE	ug/L	1	5	39	12.8	3	7	42.9	1.13	1.42	4.60	2.10	2.00
PMOCRE	O-CRESOL	ug/L	2	2	39	5.1	1	7	14.3	1.60	1.33	7.20	3.80	3.00
PNFLUO	FLUORENE	ug/L	1	1	39	2.6	1	7	14.3	1.05	1.38	7.60	7.60	2.00
DIOXINS AND FURANS														
P8CDD	OCTACHLORODIBENZODIOXIN	ng/L	1	2	8	25.0	2	7	28.6	0.25	3.33	1.40	0.08	0.30
P4CDF	TETRACHLORODIBENZOFURAN	ng/L	2	1	8	12.5	1	7	14.3	0.09	2.20	0.10	0.10	0.10
PESTICIDES,HERBICIDES,PCBS														
P1BHCG	GAMMA-BHC(HEXACHLORCYCLOHEXANE)	ug/L	2	29	40	72.5	6	7	85.7	0.02	2.28	0.09	0.01	0.01

TABLE 5-8 b - GLOBAL SUMMARY OF CONTAMINANTS IN PRIMARY EFFLUENTS

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	GLOBAL # SAMPS. DET.	GLOBAL # SAMPS. TESTED	GLOBAL % FREQ. DET.	GLOBAL # PLANTS DET.	GLOBAL # PLANTS	GLOBAL % PLANT PREV.	GLOBAL GEO. MEAN	GLOBAL SPREAD FACTOR	GLOBAL MAX. CONC.	GLOBAL MIN. CONC. > DL	DET. LIMIT (DL)
PESTICIDES,HERBICIDES,PCBS														
P324D	2,4-DICHLOROPHENOXYACETIC ACID	ug/l.	3	27	40	67.5	6	7	85.7	0.06	4.96	1.70	0.02	0.02
P3SILV	SILVEX	ug/l.	3	9	40	22.5	4	7	57.1	0.03	2.19	1.40	0.05	0.05
P1PCBT	PCB, TOTAL	ug/l.	2	7	40	17.5	2	7	28.6	0.03	3.06	0.45	0.05	0.04
P3245T	2,4,5-TRICLORPHENOXYACETIC ACID	ug/l.	3	7	40	17.5	3	7	42.9	0.04	2.61	2.80	0.06	0.05
P1BHCB	BETA-BHC (HEXCHLORCYCLOHEXANE)	ug/l.	1	6	40	15.0	2	7	28.6	0.01	1.36	0.02	0.01	0.01
X2HCE	HEXACHLOROETHANE	ug/l.	3	5	40	12.5	1	7	14.3	0.01	1.64	0.03	0.02	0.01
P1BHCA	ALPHA-BHC(HEXCHLORCYCLOHEXANE)	ug/l.	1	2	40	5.0	1	7	14.3	0.01	1.58	0.05	0.03	0.01
P1END2	ENDOSULFAN II	ug/l.	3	1	40	2.5	1	7	14.3	0.01	1.12	0.01	0.01	0.01
P1END5	ENDOSULFAN SULPHATE	ug/l.	3	1	40	2.5	1	7	14.3	0.02	1.36	0.14	0.14	0.04
P1HEPT	HEPTACHLOR	ug/l.	3	1	40	2.5	1	7	14.3	0.01	1.25	0.02	0.02	0.01
P1MIRX	MIREX	ug/l.	1	1	40	2.5	1	7	14.3	0.01	1.39	0.04	0.04	0.01
P1PPDT	PP-DDT	ug/l.	3	1	40	2.5	1	7	14.3	0.02	1.31	0.11	0.11	0.04
X1HCCP	HEXACHLOROCYCLOPENTADIENE	ug/l.	3	1	40	2.5	1	7	14.3	0.05	1.03	0.06	0.06	0.10
X2124	1,2,4-TRICHLOROBENZENE	ug/l.	3	1	40	2.5	1	7	14.3	0.01	1.33	0.03	0.03	0.01
VOLATILES ORGANIC COMPOUNDS														
X1TETR	TETRACHLOROETHYLENE	ug/l.	1	21	38	55.3	6	7	85.7	4.39	5.84	380.00	2.20	2.00
B2OXYL	O-XYLENE	ug/l.	1	13	38	34.2	6	7	85.7	1.94	3.05	39.00	2.70	2.00
B2MPXY	M-, AND P-XYLENES	ug/l.	1	10	38	26.3	6	7	85.7	1.83	3.42	83.00	2.20	2.00
X1111T	1,1,1-TRICHLOROETHANE	ug/l.	1	10	38	26.3	2	7	28.6	2.34	5.17	160.00	3.70	2.00
X1CTET	CARBON TETRACHLORIDE	ug/l.	1	9	38	23.7	1	7	14.3	2.05	3.84	53.00	4.60	2.00
X1TRIC	TRICHLOROETHYLENE	ug/l.	1	7	38	18.4	3	7	42.9	1.71	3.60	420.00	6.40	2.00
B2ETBNZ	ETHYLBENZENE	ug/l.	1	5	38	13.2	2	7	28.6	1.29	2.03	17.00	2.20	2.00
X1DCLE	1,1-DICHLOROETHENE	ug/l.	1	3	38	7.9	1	7	14.3	1.43	3.44	110.00	70.00	2.00
B1OCTE	1-OCTENE	ug/l.	1	1	38	2.6	1	7	14.3	1.58	1.36	10.00	10.00	3.00
B2STYR	STYRENE	ug/l.	1	1	38	2.6	1	7	14.3	1.59	1.45	15.00	15.00	3.00

5.3.5 Summary of Contaminants in Lagoon Effluents

Table 5-9(a) presents the contaminants that were not detected in any effluent sample from either of the two lagoons sampled. In total, 133 contaminants were not detected, including 12 that were not confirmed. Also indicated in the Table are these 34 contaminants not detected in any sample at any WPCP.

Table 5-9(b) shows that in the lagoon effluents, only 7 organic compounds were detected, all from the pesticide/herbicide group. Only one herbicide (2,4-Dichlorophenoxy-acetic acid) was detected at both lagoons. Of the 10 metals detected, 9 were detected at both lagoons.

Only 3 organic compounds (2,4-Dichlorophenoxy-acetic acid, Methoxyclor and 1,2,4-Trichlorobenzene) were detected in more than 1 or 10 percent of the samples. Four metals (Al, Hg, Sr and Zn) were detected in more than 90 percent of the samples, while the other metals (Cd, Co, Mo, Ni, Cr, Cu) were detected in at least 17 percent of the samples.

5.3.6 Summary of Contaminants in Secondary Effluents

Table 5-10(a) presents the contaminants that were not detected in any effluent sample from any of the 28 secondary WPCPs. A total of 74 contaminants were never detected including 5 that were not confirmed. Also indicated in the Table are the 34 compounds never detected in any type of sample at any WPCP.

Data regarding contaminants detected in secondary WPCP effluents is presented in Table 5-10(b). Sixty-eight organic compounds, 14 metals and cyanide were detected in at least one secondary effluent sample. However, none of the base-neutral and acid extractable compounds or dioxins and furans were detected at more than 15 percent of the WPCP (4 plants).

Only 8 of the 23 compounds in the pesticide/herbicide group and 3 of the 17 volatile organic compounds were detected at more than 15 percent of the WPCPs. Metals were the most prevalent contaminants, with 11 metals detected at more than 50 percent of the WPCPs.

As noted, the most frequently detected contaminant group was metals, with 7 metals detected in greater than 50 percent of the secondary effluent samples. The most frequently detected base neutral and acid extractable compounds were found in less than 4 percent of samples; dioxin/furan compounds were found in less than 9 percent of samples, and volatile organic compounds were found in less than 10 percent of samples. Two pesticide/herbicide compounds (2,4-Dichlorophenoxyacetic and gamma-BHC) were detected in at least 70 percent of all the final effluent samples.

TABLE 5-9 a - GLOBAL SUMMARY OF CONTAMINANTS NOT DETECTED IN LAGOON EFFLUENTS

CONFIRMED		NOT CONFIRMED	
CONTAMINANT CODE	CONTAMINANT NAME	CONTAMINANT CODE	CONTAMINANT NAME
	METALS AND CYANIDE		
AGUT	SILVER,UNFILT.TOTAL		
ASUT	ARSENIC,UNFILT.TOTAL		
BEUT	BERYLLIUM,UNFILT.TOTAL		
CCNFUR	CYANIDE-FREE,UNFILT.REAC.		
PBUT	LEAD,UNFILT.TOTAL		
SEUT	SELENIUM,UNFILT.TOTAL		
	BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS		
P2AMET	AMETRYNE	PMPCRE	P-CRESOL*
P2ATRA	ATRAZINE*		
P4DIAZ	DIAZINON*		
P4EPAR	PARATHION ETHYL*		
P4MALA	MALATHION*		
P4MPAR	METHYLPARATHION*		
PM24DP	2,4-DICHLOROPHENOL		
PM24DT	2,4-DINITROTOLUENE		
PM24MP	2,4-DIMETHYLPHENOL		
PM24NP	2,4-DINITROPHENOL*		
PM26DT	2,6-DINITROTOLUENE		
PM2NP	2-NITROPHENOL		
PM46DP	2-METHYL4,6-DINITROPHENOL		
PM4BPE	4-BROMOPHENYLPHENYLETHER		
PM4CPE	4-CHLOROPHENYLPHENYLETHER		
PM4NP	4-NITROPHENOL		
PMANAA	ALPHA-NAPHTHYLAMINE*		
PMB2EM	BIS(2-CHLORETHOXY)METHANE		
PMB2IE	BIS(2-CHLOROISOPROPYL)ETHER		
PMB2NE	BIS-(2-CHLOROMETHYL)ETHER		
PMBBP	BUTYLBENZYLPHTHALATE		
PMBNAA	BETA-NAPHTHYLAMINE*		
PMDMP	DIMETHYL PHTHALATE		
PMDPE	DIPHENYL ETHER		
PMMCRE	M-CRESOL		
PMNITB	NITROBENZENE		
PMNND	N-NITROSO-DI-PHENYLAMINE		
PMNNP	N-NITROSO-DI-NPROPYLAMINE		
PMOCRE	O-CRESOL		
PMPCMC	P-CHLORO-M-CRESOL		
PMPHEN	PHENOL		
PN2CNA	CHLORONAPHTHALENE*		
PNACNE	ACENAPHTHENE*		
PNACNY	ACENAPHTHYLENE		
PNANTH	ANTHRACENE		
PNBAA	BENZO(A)ANTHRACENE		
PNBAP	BENZO(A)PYRENE		
PNBBFA	BENZO(B)FLUORANTHENE		
PNBIPH	BIPHENYL		
PNBKF	BENZO(K)FLUORANTHENE		
PNCHRY	CHRYSENE		
PNDAHA	DIBENZO(A,H)ANTHRACENE*		
PNFLAN	FLUORANTHENE		
PNFLUO	FLUORENE		
PNGHIP	BENZO(G,H,I)PERYLENE*		
PNINP	IDENO(1,2,3-CD)PYRENE*		
PNNAPH	NAPHTHALENE		
PNPHEN	PHENANTHRENE		
PNPYR	PYRENE		
PODICH	DICHLORAN*		
POTOC	TRI-O-CRESYL PHOSPHATE*		
X30010	2-CHLOROPHENOL		
X3245	2,4,5-TRICHLOROPHENOL*		
X3246	2,4,6-TRICHLOROPHENOL		
X3PCPH	PENTACHLOROPHENOL		
	DIOXINS AND FURANS		
P94CDD	TETRACHLORODIBENZODIOXIN*		
P94CDF	TETRACHLORODIBENZOFURAN		
P95CDD	PENTACHLORODIBENZODIOXIN		
P95CDF	PENTACHLORODIBENZOFURAN		
P96CDD	HEXACHLORODIBENZODIOXIN		
P96CDF	HEXACHLORODIBENZOFURAN		
P97CDD	HEPTACHLORODIBENZODIOXIN		
P97CDF	HEPTACHLORODIBENZOFURAN		
P98CDD	OCTACHLORODIBENZODIOXIN		
P98CDF	OCTACHLORODIBENZOFURAN		

* - NOT DETECTED IN ANY STREAM TYPE AT ANY PLANT

TABLE 5-9 a - GLOBAL SUMMARY OF CONTAMINANTS NOT DETECTED IN LAGOON EFFLUENTS

CONFIRMED		NOT CONFIRMED	
CONTAMINANT CODE	CONTAMINANT NAME	CONTAMINANT CODE	CONTAMINANT NAME
	PESTICIDES, HERBICIDES, PCBS		
P0PCNB	PCNB	P0CAPN	CAPTAN*
P1ALDR	ALDRIN	P1END1	ENDOSULFAN I
P1BHCA	ALPHA-BHC(HEXCHLORCYCLHEXANE)	P1END2	ENDOSULFAN II
P1BHCB	BETA-BHC (HEXCHLORCYCLHEXANE)	P1ENDR	ENDRIN
P1BHCD	DELTA-BHC(HEXCHLORCYCLHEXANE)	P1PPDT	PP-DDT
P1CHLA	ALPHA-CHLORDANE	P3245T	2,4,5-TRICLORPHENOXYACETIC ACID
P1CHLG	GAMMA-CHLORDANE	P35II.V	SILVEX
P1DIEL	DIELDRIN	X1HCBD	HEXACHLOROBUTADIENE*
P1ENDA	ELDRIN ALDEHYDE	X2HCE	HEXACHLOROETHANE
P1HEPE	HEPTACHLOREPOXID		
P1MIRX	MIREX		
P1OCHL	OXYCHLORDANE		
P1PCBT	PCB, TOTAL		
P1PMIR	MIREX PHOTO		
P1PPDD	PP-DDD		
P1PPDE	PP-DDE		
P1STRO	STROBANE*		
P1TOX	TOXAPHENE		
X2HCB	HEXACHLOROBENZENE		
	VOLATILES		
B1OCTE	1-OCTENE	X1ACRO	ACROLEIN
B1VBR	VINYL BROMIDE*	X1ACRY	ACRYLONITRILE*
B2BDCL	BROMODICHLOROBENZENE		
B2EBNZ	ETHYLBENZENE		
B2MPXY	M-, AND P-XYLENES		
B2OXYL	O-XYLENE		
B2STYR	STYRENE		
E1DIEE	DIETHYL ETHER		
L1HEX	HEXANOL		
PM2CEE	2-CHLOROETHYLVINYLETHER*		
X1111T	1,1,1-TRICHLOROETHANE		
X11122	1,1,2,2-TETRACHLOROETHANE*		
X1112T	1,1,2-TRICHLOROETHANE*		
X111CE	1,1-DICHLOROETHANE		
X112CE	1,2-DICHLOROETHANE		
X112CP	1,2-DICHLOROPROPANE		
X113DP	CIS-1,3-DICHLOROPROPENE		
X113DR	TRANS-1,3-DICHLOROPROPENE		
X1ACTO	ALPHA-CHLOROTOLUENE		
X1BDCM	BROMODICHLOROMETHANE		
X1BETH	BROMOETHANE*		
X1BROM	BROMOFORM*		
X1CDBM	CHLORODIBROMOMETHANE		
X1CDCE	CIS-1,2-DICHLOROETHYLENE		
X1CHLE	CHLOROETHANE*		
X1CHLM	CHLOROMETHANE*		
X1CHLO	CHLOROFORM		
X1CTET	CARBON TETRACHLORIDE		
X1DCFM	DICHLORODIFLUOROMETHANE		
X1DCLE	1,1-DICHLOROETHENE		
X1T12D	TRI-1,2-DICHLOROETHYLENE*		
X1TCFM	TRICHLOROFLUOROMETHANE*		
X1TETR	TETRACHLOROETHYLENE		
X1TRIC	TRICHLOROETHYLENE		
X1VCL	VINYL CHLORIDE*		
X212CB	1,2-DICHLOROBENZENE		
X213CB	1,3-DICHLOROBENZENE		
X214CB	1,4-DICHLOROBENZENE		
X23CTO	3-CHLOROTOLUENE		
X2CBEN	CHLOROBENZENE		
X3CPPE	3-CHLOROPROPENE*		

* - NOT DETECTED IN ANY STREAM TYPE AT ANY PLANT

TABLE 5-9 b - GLOBAL SUMMARY OF CONTAMINANTS IN LAGOON EFFLUENTS

CONTAM-INANT	CONTAMINANT NAME	UNITS	QA/QC CODE	GLOBAL # SAMPS. DET.	GLOBAL # SAMPS. TESTED	GLOBAL % FREQ. DET.	GLOBAL # PLANTS DET.	GLOBAL # PLANTS	GLOBAL % PLANT PREV.	GLOBAL GEO. MEAN	GLOBAL SPREAD FACTOR	GLOBAL MAX. CONC.	GLOBAL MIN. CONC. > DL	DET. LIMIT (DL)
CONVENTIONAL														
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0	10	10	100.0	2	2	100.0	25.95	1.66	48.20	14.40	1.00
COD	CHEMICAL OXYGEN DEMAND	mg/L	0	10	10	100.0	2	2	100.0	70.64	1.47	110.00	44.00	5.00
DOC	DISSOLVED ORGANIC CARBON	mg/L	0	10	10	100.0	2	2	100.0	10.09	1.14	11.60	8.30	1.00
NNO2FR	NITRITE,FILT. REACT.	mg/L	0	10	10	100.0	2	2	100.0	0.42	4.77	3.62	0.11	0.01
NNO3FR	NITRATES,TOTAL FILT.REAC.	mg/L	0	10	10	100.0	2	2	100.0	1.65	3.25	6.15	0.40	0.05
NNTKUR	NITROGEN-TOT-KJEL.,UNF.TOT	mg/L	0	10	10	100.0	2	2	100.0	10.85	1.64	43.00	8.30	0.01
PH	(-LOG(H+(CONCN))		0	10	10	100.0	2	2	100.0	7.92	1.03	8.38	7.57	1.00
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/L	0	6	6	100.0	1	1	100.0	0.26	1.18	0.31	0.20	0.01
RSP	RESIDUE, PARTICULATE	mg/L	0	10	10	100.0	2	2	100.0	29.12	1.50	51.40	17.30	1.00
RSPLOI	RESIDUE,PAR.LOSS ON IGNI.	mg/L	0	2	2	100.0	1	1	100.0	40.98	1.04	42.20	39.80	0.00
TURB	TURBIDITY	mg/L	0	5	5	100.0	1	1	100.0	25.76	1.20	30.00	19.40	0.25
NNHTPR	AMMONIUM,TOTAL FILT.REAC.	mg/L	0	6	10	60.0	2	2	100.0	0.60	12.80	6.35	0.65	0.20
PHNOL	PHENOLICS (4AAP)	mg/L	0	2	10	20.0	1	2	50.0	0.07	1.91	0.34	0.13	0.10
METALS AND CYANIDE														
ALUT	ALUMINUM,UNFILT.TOTAL.	ug/L	0	12	12	100.0	2	2	100.0	171.20	1.31	240.00	100.00	20.00
HGUT	MERCURY,UNFILT.TOTAL.	ug/L	0	10	10	100.0	2	2	100.0	0.01	1.25	0.02	0.01	0.01
SRUT	STRONTIUM,UNFILT.TOTAL.	ug/L	0	12	12	100.0	2	2	100.0	230.70	1.36	330.00	160.00	10.00
ZNUT	ZINC,UNFILT.TOTAL.	ug/L	0	11	12	91.7	2	2	100.0	11.90	1.37	20.00	10.00	20.00
CUUT	COPPER,UNFILT.TOTAL.	ug/L	0	1	2	50.0	1	2	50.0	10.00	0.00	10.00	10.00	10.00
CDUT	CADMIUM,UNFILT.TOTAL.	ug/L	0	3	12	25.0	2	2	100.0	1.80	1.49	4.00	3.00	3.00
COUT	COBALT,UNFILT.TOTAL.	ug/L	0	3	12	25.0	2	2	100.0	6.30	1.41	10.00	10.00	10.00
MOUT	MOLYBDENUM,UNFILT.TOTAL.	ug/L	0	3	12	25.0	2	2	100.0	5.90	1.37	10.00	10.00	10.00
NIUT	NICKEL,UNFILT.TOTAL.	ug/L	0	3	12	25.0	2	2	100.0	6.90	1.74	30.00	10.00	10.00
CRUT	CHROMIUM,UNFILT.TOTAL.	ug/L	0	2	12	16.7	1	2	50.0	5.90	1.37	10.00	10.00	10.00
PESTICIDES,HERBICIDES,PCBS														
P24D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	7	10	70.0	2	2	100.0	0.03	2.08	0.10	0.03	0.02
P1DMDT	METHOXYCHLOR	ug/L	1	4	10	40.0	1	2	50.0	0.07	3.77	0.70	0.10	0.05
X2126	1,2,4-TRICHLOROBENZENE	ug/L	3	2	10	20.0	1	2	50.0	0.01	2.11	0.04	0.02	0.01
P1BHCG	GAMMA-BHC(HEXACHLORCYCLHEXANE)	ug/L	2	1	10	10.0	1	2	50.0	0.01	1.25	0.01	0.01	0.01
P1ENDS	ENDOSULFAN SULPHATE	ug/L	3	1	10	10.0	1	2	50.0	0.02	1.89	0.15	0.15	0.04
P1HEPT	HEPTACHLOR	ug/L	3	1	10	10.0	1	2	50.0	0.01	1.25	0.01	0.01	0.01
X1HCCP	HEXACHLOROCYCLOPENTADIENE	ug/L	3	1	10	10.0	1	2	50.0	0.06	1.35	0.13	0.13	0.10

TABLE 5-10 a - GLOBAL SUMMARY OF CONTAMINANTS NOT DETECTED IN SECONDARY EFFLUENTS

CONFIRMED		NOT CONFIRMED	
CONTAMINANT CODE	CONTAMINANT NAME	CONTAMINANT CODE	CONTAMINANT NAME
	METALS AND CYANIDE		
BELT	BERYLLIUM,UNFILT.TOTAL		
	BASE NEUTRAL & ACID EXTRACTABLE COMPOUNDS		
P2AMET	AMETRYNE	PMPCRE	P-CRESOL*
P2ATRA	ATRAZINE*		
P4DIAZ	DIAZINON*		
P4EPAR	PARATHION ETHYL*		
P4MALA	MALATHION*		
P4MPAR	METHYLPARATHION*		
PM24MP	2,4-DIMETHYLPHENOL		
PM24NP	2,4-DINITROPHENOL*		
PM4BPE	4-BROMOPHENYLPHENYLETHER		
PM4CPE	4-CHLOROPHENYLPHENYLETHER		
PMANAA	ALPHA-NAPHTHYLAMINE*		
PMB2IE	BIS(2-CHLOROISOPROPYL)ETHER		
PMBNAA	BETA-NAPHTHYLAMINE*		
PMDPE	DIPHENYL ETHER		
PMNND	N-NITROSO-DI-PHENYLAMINE		
PN2CNA	CHLORONAPHTHALENE*		
PNACNE	ACENAPHTHENE*		
PNACNY	ACENAPHTHYLENE		
PNANTH	ANTHRACENE		
PNBAP	BENZO(A)PYRENE		
PNBBFA	BENZO(B)FLUORANTHENE		
PNBIPH	BIPHENYL		
PNCHRY	CHRYSENE		
PNDAHA	DIBENZO(A,H)ANTHRACENE*		
PNFLAN	FLUORANTHENE		
PNFLUO	FLUORENE		
PNGHIP	BENZO(G,H,I)PERYLENE*		
PNINP	IDENO(1,2,3-CD)PYRENE*		
PODICH	DICHLORAN*		
POTOC	TRI-O-CRESYL PHOSPHATE*		
X3245	2,4,5-TRICHLOROPHENOL*		
	DIOXINS AND FURANS		
P94CDD	TETRACHLORODIBENZODIOXIN*		
P95CDD	PENTACHLORODIBENZODIOXIN		
P95CDF	PENTACHLORODIBENZOFURAN		
P96CDD	HEXACHLORODIBENZODIOXIN		
P96CDF	HEXACHLORODIBENZOFURAN		
P97CDF	HEPTACHLORODIBENZOFURAN		
	PESTICIDES, HERBICIDES, PCBS		
P0PCNB	PCNB	P0CAPN	CAPTAN*
P1ALDR	ALDRIN	X1HCBD	HEXACHLOROBUTADIENE*
P1BHCD	DELTA-BHC(HEXCHLORCYCLOHEXANE)		
P1ENDA	ELDRIN ALDEHYDE		
P1HEPE	HEPTACHLOREPOXIDE		
P1OCHL	OXYCHLORDANE		
P1PMIR	MIREX PHOTO		
P1STRO	STROBANE*		
X29CB	HEXACHLOROBENZENE		
	VOLATILES		
B1OCTE	1-OCTENE	X1ACRO	ACROLEIN
B1VBR	VINYL BROMIDE*	X1ACRY	ACRYLONITRILE*
E1DEE	DIETHYL ETHER		
L1HEX	HEXANOL		
PM2CEE	2-CHLOROETHYLVINYLETHER*		
X11122	1,1,2,2-TETRACHLOROETHANE*		
X1112T	1,1,2-TRICHLOROETHANE*		
X112CP	1,2-DICHLOROPROPANE		
X113DP	CIS-1,3-DICHLOROPROPENE		
X1BETH	BROMOETHANE*		
X1BROM	BROMOFORM*		
X1CHLE	CHLOROETHANE*		
X1CHLM	CHLOROMETHANE*		
X1CTET	CARBON TETRACHLORIDE		
X1T12D	TRI-1,2-DICHLOROETHYLENE*		
X1TCFM	TRICHLOROFLUOROMETHANE*		
X1VCL	VINYL CHLORIDE*		
X212CB	1,2-DICHLOROBENZENE		
X213CB	1,3-DICHLOROBENZENE		
X214CB	1,4-DICHLOROBENZENE		
X23CTO	3-CHLOROTOLUENE		
X3CPE	3-CHLOROPROPENE*		

* - NOT DETECTED IN ANY STREAM TYPE AT ANY PLANT

TABLE 5-10 b - GLOBAL SUMMARY OF CONTAMINANTS IN SECONDARY EFFLUENTS

CONTAM-INANT	CONTAMINANT NAME	UNITS	QA/QC CODE	GLOBAL # SAMPS. DET.	GLOBAL # SAMPS. TESTED	GLOBAL % FREQ. DET.	GLOBAL # PLANTS DET.	GLOBAL # PLANTS	GLOBAL % PLANT PREV.	GLOBAL GEO. MEAN	GLOBAL SPREAD FACTOR	GLOBAL MAX. CONC.	GLOBAL MIN. CONC. > DL	DET. LIMIT (DL)
CONVENTIONAL														
DOC	DISSOLVED ORGANIC CARBON	mg/L	0	220	220	100.0	28	28	100.0	8.09	1.60	297.00	2.70	1.00
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0	222	222	100.0	28	28	100.0	7.97	2.71	32.10	0.80	0.01
PH	(-LOG(H+(CONCN))		0	224	224	100.0	28	28	100.0	7.10	1.05	8.18	6.38	1.00
TURB	TURBIDITY	mg/L	0	153	153	100.0	22	22	100.0	7.41	2.90	200.00	0.46	0.25
RSP	RESIDUE, PARTICULATE	mg/L	0	219	220	99.6	28	28	100.0	10.12	2.00	242.00	3.50	1.00
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0	211	213	99.1	28	28	100.0	21.22	2.07	110.00	3.50	1.00
COD	CHEMICAL OXYGEN DEMAND	mg/L	0	211	213	99.1	28	28	100.0	52.80	1.83	226.00	12.00	5.00
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/L	0	206	211	97.6	24	24	100.0	0.68	1.97	5.45	0.19	0.01
NNHTPR	AMMONIUM,TOTAL FILT.REAC.	mg/L	0	204	223	91.5	28	28	100.0	3.90	6.98	27.70	0.05	0.20
NNO2PR	NITRITE,FILT. REACT.	mg/L	0	194	220	88.2	27	28	96.4	0.22	5.93	3.30	0.03	0.01
NNOTPR	NITRATES,TOTAL FILT.REAC.	mg/L	0	186	224	83.0	27	28	96.4	2.33	7.75	28.40	0.25	0.05
RSILOI	RESIDUE,PARLOSS ON IGNI.	mg/L	0	58	77	75.3	14	15	93.3	7.47	2.71	162.00	5.20	0.00
PHNOL	PHENOLICS (4AAP)	mg/L	0	33	225	14.7	15	28	53.6	0.07	1.86	0.68	0.10	0.10
METALS AND CYANIDE														
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	267	267	100.0	28	28	100.0	340.90	2.14	4500.00	80.00	10.00
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	262	267	98.1	28	28	100.0	53.30	2.48	1400.00	10.00	20.00
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	220	233	94.4	28	28	100.0	0.03	2.62	0.36	0.01	0.01
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	196	264	74.2	27	28	96.4	101.70	3.72	5800.00	40.00	20.00
NIUT	NICKEL,UNFILT.TOTAL	ug/L	0	171	267	64.0	24	28	85.7	22.10	3.60	900.00	10.00	10.00
CUUT	COPPER,UNFILT.TOTAL	ug/L	0	30	47	63.8	21	27	77.8	13.10	2.56	190.00	10.00	10.00
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	137	267	51.3	25	28	89.3	9.00	2.00	140.00	10.00	10.00
MOUT	MOLYBDENUM,UNFILT.TOTAL	ug/L	0	75	267	28.1	19	28	67.9	6.60	1.56	20.00	10.00	10.00
COUT	COBALT,UNFILT.TOTAL	ug/L	0	65	266	24.4	23	28	82.1	6.40	1.54	20.00	10.00	10.00
CDUT	CADMIUM,UNFILT.TOTAL	ug/L	0	65	267	24.3	20	28	71.4	2.10	2.07	14.00	3.00	3.00
CCNFUR	CYANIDE-FREE,UNFILT.REAC.	ug/L	0	42	222	18.9	13	28	46.4	1.30	3.68	43.00	6.00	1.00
PBUT	LEAD,UNFILT.TOTAL	ug/L	0	25	267	9.4	17	28	60.7	16.50	1.48	91.00	20.00	30.00
AGUT	SILVER,UNFILT.TOTAL	ug/L	0	15	267	5.6	9	28	32.1	6.90	1.84	1250.00	10.00	10.00
ASUT	ARSENIC,UNFILT.TOTAL	ug/L	0	3	252	1.2	1	28	3.6	16.70	1.67	60.00	60.00	30.00
SEUT	SELENIUM,UNFILT.TOTAL	ug/L	0	3	252	1.2	1	28	3.6	17.10	1.89	80.00	80.00	30.00
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS														
PM4CRE	M-CRESOL	ug/L	1	7	227	3.1	4	28	14.3	1.70	1.70	30.50	4.30	3.00
PP9PHEN	PHENOL	ug/L	2	4	227	1.8	5	28	10.7	1.65	1.59	17.30	7.50	3.00
PMNITB	NITROBENZENE	ug/L	1	4	228	1.8	4	28	14.3	1.09	1.54	5.70	4.50	2.00
PMBBP	BUTYLBENZYLPHTHALATE	ug/L	1	3	228	1.3	2	28	7.1	1.09	1.59	25.00	3.80	2.00
X3PCPH	PENTACHLOROPHENOL	ug/L	1	3	227	1.3	2	28	7.1	2.71	1.56	58.70	6.80	5.00
PMPCMC	P-CHLORO-M-CRESOL	ug/L	1	2	227	0.9	2	28	7.1	2.68	1.50	15.20	5.30	5.00
PM24DP	2,4-DICHLOROPHENOL	ug/L	1	1	227	0.4	1	28	3.6	2.68	1.52	28.80	28.80	5.00
PM24DT	2,4-DINITROTOLUENE	ug/L	1	1	228	0.4	1	28	3.6	1.61	1.53	23.90	23.90	3.00
PM26DT	2,6-DINITROTOLUENE	ug/L	1	1	228	0.4	1	28	3.6	1.61	1.53	26.80	26.80	3.00
PM2NP	2-NITROPHENOL	ug/L	1	1	227	0.4	1	28	3.6	2.68	1.52	28.50	28.50	5.00
PM46DP	2-METHYL4,6-DINITROPHENOL	ug/L	2	1	227	0.4	1	28	3.6	2.70	1.60	143.70	143.70	5.00
PM4NP	4-NITROPHENOL	ug/L	2	1	227	0.4	1	28	3.6	2.67	1.50	20.80	20.80	5.00
PMB2EM	BIS(2-CHLORETHOXY)METHANE	ug/L	1	1	228	0.4	1	28	3.6	1.08	1.56	32.80	32.80	2.00
PMB2NE	BIS-(2-CHLOROMETHYL)ETHER	ug/L	2	1	228	0.4	1	28	3.6	1.61	1.54	30.60	30.60	3.00
PMDMP	DIMETHYL PHTHALATE	ug/L	1	1	228	0.4	1	28	3.6	1.07	1.48	2.60	2.60	2.00
PMNNP	N-NITROSO-DI-NPROPYLAMINE	ug/L	1	1	228	0.4	1	28	3.6	1.08	1.58	43.60	43.60	2.00
PMOCRE	O-CRESOL	ug/L	2	1	227	0.4	1	28	3.6	1.60	1.49	7.50	7.50	3.00
PNBAA	BENZO(A)ANTHRACENE	ug/L	1	1	228	0.4	1	28	3.6	1.08	1.56	29.40	29.40	2.00

TABLE 5-10 b - GLOBAL SUMMARY OF CONTAMINANTS IN SECONDARY EFFLUENTS

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	GLOBAL # SAMPS. DET.	GLOBAL # SAMPS. TESTED	GLOBAL % FREQ. DET.	GLOBAL # PLANTS DET.	GLOBAL # PLANTS	GLOBAL % PLANT PREV.	GLOBAL GEO. MEAN	GLOBAL SPREAD FACTOR	GLOBAL MAX. CONC.	GLOBAL MIN. CONC. > DL	DET. LIMIT (DL)
BASE NEUTEAL AND ACID EXTRACTABLE COMPOUNDS														
PNBKF	BENZO(K)FLUORANTHENE	ug/L	1	1	228	0.4	1	28	3.6	1.07	1.53	14.60	14.60	2.00
PNNAPH	NAPHTHALENE	ug/L	1	1	228	0.4	1	28	3.6	1.06	1.48	2.40	2.40	2.00
PNPHEN	PHENANTHRENE	ug/L	1	1	228	0.4	1	28	3.6	1.07	1.53	17.80	17.80	2.00
PNPYR	PYRENE	ug/L	1	1	228	0.4	1	28	3.6	1.61	1.54	29.40	29.40	3.00
X3001O	2-CHLOROPHENOL	ug/L	0	1	227	0.4	1	28	3.6	2.66	1.47	5.10	5.10	5.00
X3246	2,4,6-TRICHLOROPHENOL	ug/L	1	1	227	0.4	1	28	3.6	2.66	1.48	9.20	9.20	5.00
DIOXINS AND FURANS														
P96CDD	OCTACHLORODIBENZODIOXIN	ng/L	1	4	44	9.1	4	28	14.3	0.31	3.43	11.00	0.10	0.30
P97CDD	HEPTACHLORODIBENZODIOXIN	ng/L	1	2	44	4.6	2	28	7.1	0.38	3.74	4.30	1.40	0.10
P96CDF	OCTACHLORODIBENZOFURAN	ng/L	1	2	44	4.6	2	28	7.1	0.28	2.90	0.50	0.50	0.20
P94CDF	TETRACHLORODIBENZOFURAN	ng/L	2	1	44	2.3	1	28	3.6	0.15	3.90	0.33	0.33	0.10
PESTICIDES,HERBICIDES,PCBS														
P324D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	177	227	78.0	28	28	100.0	0.08	4.71	34.00	0.02	0.02
P1BHCG	GAMMA-BHC(LINDANE)(GAMMA-HEXACHLORCYCLOHEXANE)	ug/L	2	157	227	69.2	27	28	96.4	0.02	2.48	0.79	0.01	0.01
X2124	1,2,4-TRICHLOROBENZENE	ug/L	3	36	227	15.9	9	28	32.1	0.01	2.44	0.36	0.02	0.01
P3245T	2,4,5-TRICLORPHENOXYACETIC ACID	ug/L	3	25	227	11.0	12	28	42.9	0.03	2.27	2.30	0.05	0.05
P35II,V	SILVEX	ug/L	3	23	227	10.1	14	28	50.0	0.03	1.83	2.90	0.05	0.05
P1BHCB	BETA-BHC (HEXCHLORCYCLOHEXANE)	ug/L	1	9	227	4.0	6	28	21.4	0.01	1.38	0.07	0.01	0.01
P1PCBT	PCB, TOTAL	ug/L	2	9	227	4.0	8	28	28.6	0.02	1.40	0.19	0.04	0.04
P1PPDE	PP-DDE	ug/L	1	7	227	3.1	5	28	17.9	0.01	1.28	0.04	0.01	0.01
P1BHCA	ALPHA-BHC(HEXCHLORCYCLOHEXANE)	ug/L	1	5	227	2.2	4	28	14.3	0.01	1.24	0.03	0.01	0.01
P1CHLA	ALPHA-CHLORDANE	ug/L	1	5	227	2.2	4	28	14.3	0.01	1.31	0.06	0.01	0.01
P1CHLG	GAMMA-CHLORDANE	ug/L	1	5	227	2.2	4	28	14.3	0.01	1.36	0.08	0.02	0.01
X2HCE	HEXACHLOROETHANE	ug/L	3	5	227	2.2	4	28	14.3	0.01	1.23	0.05	0.01	0.01
P1END8	ENDOSULFAN SULPHATE	ug/L	3	5	227	1.3	2	28	7.1	0.02	1.22	0.17	0.06	0.04
P1TOX	TOXAPHENE	ug/L	0	3	227	1.3	2	28	7.1	0.02	1.13	0.04	0.04	0.04
P1DIEL	DIELDRIN	ug/L	2	2	227	0.9	1	28	3.6	0.01	1.10	0.01	0.01	0.01
P1END2	ENDOSULFAN II	ug/L	3	2	227	0.9	1	28	3.6	0.01	1.19	0.04	0.02	0.01
P1HEPT	HEPTACHLOR	ug/L	3	2	227	0.9	2	28	7.1	0.01	1.16	0.02	0.02	0.01
P1PPDD	PP-DDD	ug/L	1	2	227	0.9	2	28	7.1	0.01	1.10	0.01	0.01	0.01
P1PPDT	PP-DDT	ug/L	3	2	227	0.9	2	28	7.1	0.02	1.14	0.07	0.06	0.04
P1END1	ENDOSULFAN I	ug/L	3	1	227	0.4	1	28	3.6	0.01	1.12	0.02	0.02	0.01
P1ENDR	ENDRIN	ug/L	3	1	227	0.4	1	28	3.6	0.01	1.14	0.03	0.03	0.01
P1MIRX	MIREX	ug/L	1	1	227	0.4	1	28	3.6	0.01	1.08	0.01	0.01	0.01
X1HCCP	HEXACHLOROCYCLOPENTADIENE	ug/L	3	1	227	0.4	1	28	3.6	0.05	1.20	0.26	0.26	0.10
VOLATILES														
X1111T	1,1,1-TRICHLOROETHANE	ug/L	1	18	226	8.0	8	28	28.6	1.10	1.86	27.00	2.10	2.00
X1TETR	TETRACHLOROETHYLENE	ug/L	1	18	226	8.0	9	28	32.1	1.10	1.93	84.00	2.00	2.00
X1TRIC	TRICHLOROETHYLENE	ug/L	1	17	226	7.6	6	28	21.4	1.12	1.55	14.00	2.00	2.00
B2M5PXY	M-, AND P-XYLENES	ug/L	1	5	226	2.2	3	28	10.7	1.05	1.45	27.00	2.40	2.00
B2OXYL	O-XYLENE	ug/L	1	5	226	2.2	4	28	14.3	1.05	1.38	17.00	2.70	2.00
X113CE	1,2-DICHLOROETHANE	ug/L	1	4	226	1.8	3	28	10.7	1.03	1.30	10.00	2.00	2.00
X1CDBM	CHLORODIBROMOMETHANE	ug/L	1	4	226	1.8	2	28	7.1	1.02	1.13	2.60	2.30	2.00

TABLE 5-10 b - GLOBAL SUMMARY OF CONTAMINANTS IN SECONDARY EFFLUENTS

CONTAM-INANT	CONTAMINANT NAME	UNITS	QA/QC CODE	GLOBAL # SAMPS. DET.	GLOBAL # SAMPS. TESTED	GLOBAL % FREQ. DET.	GLOBAL # PLANTS DET.	GLOBAL # PLANTS	GLOBAL % PLANT PREV.	GLOBAL GEO. MEAN	GLOBAL SPREAD FACTOR	GLOBAL MAX. CONC.	GLOBAL MIN. CONC. > DL	DET. LIMIT (DL)
VOLATILES														
B2BDCL	BROMODICHLOROBENZENE	ug/L	1	3	224	1.3	2	28	7.1	4.93	1.21	10.00	10.00	10.00
B2EBNZ	ETHYLBENZENE	ug/L	1	3	224	1.3	2	28	7.1	1.02	1.21	12.00	2.70	2.00
X111CE	1,1-DICHLOROETHANE	ug/L	1	3	224	1.3	3	28	10.7	1.01	1.10	2.30	2.20	2.00
X1CDCE	CIS-1,2-DICHLOROETHYLENE	ug/L	1	2	224	0.9	2	28	7.1	1.01	1.11	4.10	2.20	2.00
B2STYR	STYRENE	ug/L	1	1	224	0.5	1	28	3.6	1.51	1.16	13.00	13.00	3.00
X113DR	TRANS-1,3-DICHLOROPROPENE	ug/L	1	1	224	0.5	1	28	3.6	1.00	1.06	2.40	2.40	2.00
X1ACTO	ALPHA-CHLOROTOLUENE	ug/L	1	1	224	0.5	1	28	3.6	1.50	1.05	3.00	3.00	3.00
X1DCFM	DICHLORODIFLUOROMETHANE	ug/L	2	1	224	0.5	1	28	3.6	10.07	1.12	53.00	53.00	20.00
X1DCLE	1,1-DICHLOROETHENE	ug/L	1	1	224	0.5	1	28	3.6	1.01	1.18	2.20	2.20	2.00
X2CBEN	CHLOROBENZENE	ug/L	1	1	224	0.5	1	28	3.6	1.00	1.05	2.10	2.10	2.00

5.3.7 Summary of Contaminants in Tertiary Effluents

Only the Guelph WPCP of all the study plants provided tertiary treatment. The 128 contaminants that were not detected in the Guelph tertiary effluent including 12 that were not confirmed, are presented in Table 5-11(a). Also indicated are the 34 contaminants that were not detected in any sample type at any WPCP.

Thirty-one organic contaminants, 12 metals and cyanide were detected in at least one sample. Table 5-11(b) presents the listing of contaminants found in the Guelph tertiary effluent. Metals were the most frequently detected contaminant, with 6 metals (Al, Cr, Cu, Hg, Sr and Zn) detected in more than 75 percent of samples. Only 2 pesticide and herbicide compounds (2,4-Dichlorophenoxyacetic acid and gamma-BHC) were present in more than 50 percent of the samples. The most frequently detected volatile organic compound was detected in only 50 percent of the samples. The most frequently detected base neutral and acid extractable compound was detected in only 30 percent of samples, and there were no dioxin/furan compounds detected in the Guelph tertiary effluent.

5.3.8 Summary of Contaminants in Raw Sludges

Table 5-12(a) presents a list of the 85 contaminants that were not detected in any of the raw sludge from any WPCP, including 6 compounds that were not confirmed. Also indicated are the 34 compounds that were not detected in any sample type at any WPCP.

Table 5-12(b) presents the summary of detected contaminants for all raw sludges. A total of 59 organic compounds, 15 metals and cyanide were detected in any sample. The most prevalent organic compounds were the pesticides and herbicides, with 11 compounds detected in at least 40 percent of the plants. Only 2 of the base neutral and acid extractable compounds, 4 of the volatile compounds and 1 dioxin compound were detected at more than 20 percent of the plants. All of the metals except beryllium were detected at greater than 64 percent of the plants. Cyanide was detected at 10 percent of the plants.

The most frequently detected contaminants were metals, with 12 metals detected in at least 80 percent of the samples, including 5 (Al, Hg, Sr, Zn, Cu) that were detected in all of the samples. Only 1 of the base neutral and acid extractable compounds and 1 volatile compound were detected in more than 30 percent of the samples, and only one dioxin (Octachlorodibenzodioxin) was detected in greater than 12

TABLE 5-11 a - GLOBAL SUMMARY OF CONTAMINANTS NOT DETECTED IN TERTIARY EFFLUENTS

CONFIRMED		NOT CONFIRMED	
CONTAMINANT CODE	CONTAMINANT NAME	CONTAMINANT CODE	CONTAMINANT NAME
	METALS AND CYANIDE		
BELT	BERYLLIUM,UNFILT.TOTAL		
CCNFUR	CYANIDE-FREE,UNFILT.REAC.		
COUT	COBALT,UNFILT.TOTAL		
MOUT	MOLYBDENUM,UNFILT.TOTAL		
	BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS		
P2AMET	AMETRYNE	P#PCRE	P-CRESOL*
P2ATRA	ATRAZINE*		
P4DIAZ	DIAZINON*		
P4EPAR	PARATHION ETHYL*		
P4MALA	MALATHION*		
P4MPAR	METHYLPARATHION*		
P#24DP	2,4-DICHLOROPHENOL		
P#24DT	2,4-DINITROTOLUENE		
P#24MP	2,4-DIMETHYLPHENOL		
P#24NP	2,4-DINITROPHENOL*		
P#26DT	2,6-DINITROTOLUENE		
P#2NP	2-NITROPHENOL		
P#46DP	2-METHYL4,6-DINITROPHENOL		
P#4BPE	4-BROMOPHENYLPHENYLETHER		
P#4CPE	4-CHLOROPHENYLPHENYLETHER		
P#4NP	4-NITROPHENOL		
P#ANAA	ALPHA-NAPHTHYLAMINE*		
P#B2EM	BIS(2-CHLORETHOXY)METHANE		
P#B2IE	BIS(2-CHLOROISOPROPYL)ETHER		
P#B2NE	BIS-(2-CHLOROMETHYL)ETHER		
P#BBP	BUTYLBENZYLPHTHALATE		
P#BNAA	BETA-NAPHTHYLAMINE*		
P#DMP	DIMETHYL PHTHALATE		
P#NITB	NITROBENZENE		
P#NND	N-NITROSO-DI-PHENYLAMINE		
P#NNP	N-NITROSO-DI-NPROPYLAMINE		
P#OCRE	O-CRESOL		
P#PCMC	P-CHLORO-M-CRESOL		
P#PHEN	PHENOL		
PN2CNA	CHLORONAPHTHALENE*		
PNACNE	ACENAPHTHENE*		
PNACNY	ACENAPHTHYLENE		
PNANTH	ANTHRACENE		
PNBAA	BENZO(A)ANTHRACENE		
PNBAP	BENZO(A)PYRENE		
PNBBFA	BENZO(B)FLUORANTHENE		
PNBIPH	BIPHENYL		
PNBKF	BENZO(K)FLUORANTHENE		
PNCHRY	CHRYSENE		
PNDAHA	DIBENZO(A,H)ANTHRACENE*		
PNFLAN	FLUORANTHENE		
PNFLUO	FLUORENE		
PNGHIP	BENZO(G,H,I)PERYLENE*		
PNINP	IDENO(1,2,3-CD)PYRENE*		
PNNAPH	NAPHTHALENE		
PNPHEN	PHENANTHRENE		
PNPYR	PYRENE		
PODICH	DICHLORAN*		
POTOC	TRI-O-CRESYL PHOSPHATE*		
X3001O	2-CHLOROPHENOL		
X3245	2,4,5-TRICHLOROPHENOL*		
X3246	2,4,6-TRICHLOROPHENOL		
X3PCPH	PENTACHLOROPHENOL		
	DIOXINS AND FURANS		
P#4CDD	TETRACHLORODIBENZODIOXIN*		
P#4CDF	TETRACHLORODIBENZOFURAN		
P#5CDD	PENTACHLORODIBENZODIOXIN		
P#5CDF	PENTACHLORODIBENZOFURAN		
P#6CDD	HEXACHLORODIBENZODIOXIN		
P#6CDF	HEXACHLORODIBENZOFURAN		
P#7CDF	HEPTACHLORODIBENZOFURAN		
P#8CDF	OCTACHLORODIBENZOFURAN		
	PESTICIDES, HERBICIDES, PCBS		
P#PCNB	PCNB	P0CAPN	CAPTAN*
P1BHCA	ALPHA-BHC(HEXCHLORCYCLHEXANE)	P1END2	ENDOSULFAN II
P1BHCG	GAMMA-BHC(HEXCHLORCYCLHEXANE)	P1ENDR	ENDRIN
P1DMDT	METHOXYCHLOR	P1END5	ENDOSULFAN SULPHATE
P1MIRX	MIREX	P1HEPT	HEPTACHLOR

* - NOT DECTECTED IN ANY STREAM TYPE AT ANY PLANT

TABLE 5-11 a - GLOBAL SUMMARY OF CONTAMINANTS NOT DETECTED IN TERTIARY EFFLUENTS

CONFIRMED		NOT CONFIRMED	
CONTAMINANT CODE	CONTAMINANT NAME	CONTAMINANT CODE	CONTAMINANT NAME
	PESTICIDES, HERBICIDES, PCBS		
P1OCHL	OXYCHLORDANE	P324D	2,4-DICHLOROPHENOXYACETIC ACID
P1PMIR	MIREX PHOTO	X1HCB D	HEXACHLOROBUTADIENE*
P1STRO	STROBANE*	X1HCCP	HEXACHLOROCYCLOPENTADIENE
P1TOX	TOXAPHE	X2124	1,2,4-TRICHLOROBENZENE
X2HCB	HEXACHLOROBENZENE		
	VOLATILES		
B1OCTE	1-OCTENE	X1ACRO	ACROLEIN
B1VBR	VINYL BROMIDE*	X1ACRY	ACRYLONITRILE*
B2BDCL	BROMODICHLOROBENZENE		
B2EBNZ	ETHYLBENZENE		
B2MPXY	M-, AND P-XYLENES		
B2OXYL	O-XYLENE		
B2STYR	STYRENE		
E1DIEE	DIETHYL ETHER		
L1HEX	HEXANOL		
PM2CEE	2-CHLOROETHYLVINYLETHER*		
X1111T	1,1,1-TRICHLOROETHANE		
X11122	1,1,2,2-TETRACHLOROETHANE*		
X1112T	1,1,2-TRICHLOROETHANE*		
X111CE	1,1-DICHLOROETHANE		
X112CE	1,2-DICHLOROETHANE		
X112CP	1,2-DICHLOROPROPANE		
X113DP	CIS-1,3-DICHLOROPROPENE		
X113DR	TRANS-1,3-DICHLOROPROPENE		
X1ACTO	ALPHA-CHLOROTOLUENE		
X1BDCM	BROMODICHLOROMETHANE		
X1BETH	BROMOETHANE*		
X1BROM	BROMOFORM*		
X1CDBM	CHLORODIBROMOMETHANE		
X1CDCE	CIS-1,2-DICHLOROETHYLENE		
X1CHLE	CHLOROETHANE*		
X1CHLM	CHLOROMETHANE*		
X1CHLO	CHLOROFORM		
X1CTET	CARBON TETRACHLORIDE		
X1DCFM	DICHLORODIFLUOROMETHANE		
X1DCLE	1,1-DICHLOROETHENE		
X1T12D	TRI-1,2-DICHLOROETHYLENE*		
X1TCFM	TRICHLOROFLUOROMETHANE*		
X1TETR	TETRACHLOROETHYLENE		
X1TRIC	TRICHLOROETHYLENE		
X1VCL	VINYL CHLORIDE*		
X212CB	1,2-DICHLOROBENZENE		
X213CB	1,3-DICHLOROBENZENE		
X214CB	1,4-DICHLOROBENZENE		
X23CTO	3-CHLOROTOLUENE		
X2CBEN	CHLOROBENZENE		
X3CPPE	3-CHLOROPROPENE*		

* - NOT DECTECTED IN ANY STREAM TYPE AT ANY PLANT

TABLE 5-11 b - GLOBAL SUMMARY OF CONTAMINANTS IN TERTIARY EFFLUENTS

CONTAM-INANT	CONTAMINANT NAME	UNITS	QA/QC CODE	GLOBAL # SAMPS. DET.	GLOBAL # SAMPS. TESTED	GLOBAL % FREQ. DET.	GLOBAL # PLANTS DET.	GLOBAL # PLANTS	GLOBAL % PLANT PREV.	GLOBAL GEO. MEAN	GLOBAL SPREAD FACTOR	GLOBAL MAX. CONC.	GLOBAL MIN. CONC. > DL	DET. LIMIT (DL)
CONVENTIONAL														
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0	9	9	100.0	1	1	100.0	24.64	1.48	56.40	16.00	0.00
COD	CHEMICAL OXYGEN DEMAND	mg/L	0	9	9	100.0	1	1	100.0	99.25	1.80	282.00	46.00	0.00
DOC	DISSOLVED ORGANIC CARBON	mg/L	0	9	9	100.0	1	1	100.0	8.74	1.19	10.90	7.00	0.00
NNHTPR	AMMONIUM,TOTAL FILT.REAC.	mg/L	0	9	9	100.0	1	1	100.0	18.24	1.08	20.80	16.60	0.00
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0	9	9	100.0	1	1	100.0	23.22	1.17	34.00	19.80	0.00
PH	(-LOG(H+(CONCN))		0	9	9	100.0	1	1	100.0	7.10	1.04	7.49	6.82	0.00
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/L	0	10	10	100.0	1	1	100.0	1.56	1.92	5.93	0.78	0.50
RSP	RESIDUE, PARTICULATE	mg/L	0	8	8	100.0	1	1	100.0	32.21	1.74	71.80	17.10	0.00
TURB	TURBIDITY	mg/L	0	5	5	100.0	1	1	100.0	10.99	1.39	18.30	8.20	0.00
NNO2PR	NITRITE,FILT. REACT.	mg/L	0	8	9	88.9	1	1	100.0	0.05	3.45	0.15	0.03	0.00
NNOTPR	NITRATES,TOTAL FILT.REAC.	mg/L	0	5	9	55.6	1	1	100.0	0.14	4.23	0.50	0.40	0.00
METALS AND CYANIDE														
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	11	11	100.0	1	1	100.0	1252.00	1.88	2900.00	560.00	500.00
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	11	11	100.0	1	1	100.0	68.80	1.84	270.00	30.00	500.00
CUUT	COPPER,UNFILT.TOTAL	ug/L	0	2	2	100.0	1	1	100.0	54.80	3.03	120.00	25.00	500.00
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	9	9	100.0	1	1	100.0	0.17	1.73	0.39	0.07	0.01
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	11	11	100.0	1	1	100.0	1170.70	1.11	1400.00	990.00	500.00
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	11	11	100.0	1	1	100.0	959.60	1.30	1600.00	650.00	500.00
CCNFUR	CYANIDE-FREE,UNFILT.REAC.	ug/L	0	7	9	77.8	1	1	100.0	14.60	4.19	70.00	7.00	3.00
CDUT	CADMIUM,UNFILT.TOTAL	ug/L	0	3	11	27.3	1	1	100.0	6.30	1.74	20.00	11.00	500.00
COUT	COBALT,UNFILT.TOTAL	ug/L	0	3	11	27.3	1	1	100.0	9.00	2.75	70.00	10.00	1000.00
PBUT	LEAD,UNFILT.TOTAL	ug/L	0	2	11	18.2	1	1	100.0	55.90	1.50	130.00	110.00	500.00
AGUT	SILVER,UNFILT.TOTAL	ug/L	0	1	11	9.1	1	1	100.0	6.60	2.02	10.00	10.00	50.00
MOUT	MOLYBDENUM,UNFILT.TOTAL	ug/L	0	1	11	9.1	1	1	100.0	11.30	1.52	40.00	40.00	250.00
NIUT	NICKEL,UNFILT.TOTAL	ug/L	0	1	11	9.1	1	1	100.0	25.80	1.12	36.00	36.00	3000.00
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS														
PM24MP	2,4-DIMETHYLPHENOL	ug/L	2	3	10	30.0	1	1	100.0	3.40	1.57	7.50	5.60	500.00
PMPHEN	PHENOL	ug/L	2	3	10	30.0	1	1	100.0	1.99	1.59	4.40	3.40	300.00
PM24DP	2,4-DICHLOROPHENOL	ug/L	1	1	10	10.0	1	1	100.0	2.87	1.55	9.90	9.90	300.00
PM24DT	2,4-DINITROTOLUENE	ug/L	1	1	10	10.0	1	1	100.0	1.70	1.49	5.30	5.30	300.00
PM26DT	2,6-DINITROTOLUENE	ug/L	1	1	10	10.0	1	1	100.0	1.77	1.68	7.70	7.70	300.00
PM2NP	2-NITROPHENOL	ug/L	1	1	10	10.0	1	1	100.0	2.73	1.32	6.00	6.00	500.00
PM46DP	2-METHYL4,6-DINITROPHENOL	ug/L	2	1	10	10.0	1	1	100.0	3.18	2.14	27.60	27.60	500.00
PMB2RM	BIS(2-CHLORETHOXY)METHANE	ug/L	1	1	10	10.0	1	1	100.0	1.31	2.34	14.80	14.80	200.00
PMB2NE	BIS-(2-CHLOROMETHYL)ETHER	ug/L	2	1	10	10.0	1	1	100.0	1.86	1.97	12.70	12.70	300.00
PMBBP	BUTYLBENZYLPHTHALATE	ug/L	1	1	10	10.0	1	1	100.0	1.13	1.46	3.30	3.30	300.00
PMNNP	N-NITROSO-DI-NPROPYLAMINE	ug/L	1	1	10	10.0	1	1	100.0	1.34	2.55	19.20	19.20	200.00
PNBAA	BENZO(A)ANTHRACENE	ug/L	1	1	10	10.0	1	1	100.0	1.29	2.23	12.60	12.60	200.00
PNBKF	BENZO(K)FLUORANTHENE	ug/L	1	1	10	10.0	1	1	100.0	1.16	1.62	4.60	4.60	200.00
PNPYR	PYRENE	ug/L	1	1	10	10.0	1	1	100.0	1.85	1.93	12.00	12.00	300.00
X3PCPH	PENTACHLOROPHENOL	ug/L	1	1	10	10.0	1	1	100.0	3.10	1.97	21.50	21.50	500.00

TABLE 5-8 b - GLOBAL SUMMARY OF CONTAMINANTS IN TERTIARY EFFLUENTS

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	GLOBAL # SAMPS. DET.	GLOBAL # SAMPS. TESTED	GLOBAL % FREQ. DET.	GLOBAL # PLANTS DET.	GLOBAL # PLANTS	GLOBAL % PLANT PREV.	GLOBAL GEO. MEAN	GLOBAL SPREAD FACTOR	GLOBAL MAX. CONC.	GLOBAL MIN. CONC. >DL	DET. LIMIT (DL)
PESTICIDES,HERBICIDES,PCBS														
P324D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	9	10	90.0	1	1	100.0	0.12	2.56	0.67	0.05	0.40
P1BHCG	GAMMA-BHC(HEXCHLORCYCLHEXANE)	ug/L	2	8	10	80.0	1	1	100.0	0.04	3.37	0.75	0.02	0.20
P1BHCB	BETA-BHC (HEXCHLORCYCLHEXANE)	ug/L	1	3	10	30.0	1	1	100.0	0.02	3.03	0.17	0.05	0.20
P1DMDT	METHOXYCHLOR	ug/L	1	2	10	20.0	1	1	100.0	0.07	1.90	0.26	0.20	1.00
P3SILV	SILVEX	ug/L	3	2	10	20.0	1	1	100.0	0.06	1.34	0.10	0.10	1.00
P1ENDR	ENDRIN	ug/L	3	1	10	10.0	1	1	100.0	0.01	1.66	0.05	0.05	0.20
P1PCBT	PCB, TOTAL	ug/L	2	1	10	10.0	1	1	100.0	0.05	1.55	0.16	0.16	0.80
X2124	1,2,4-TRICHLOROBENZENE	ug/L	3	1	10	10.0	1	1	100.0	0.01	1.66	0.05	0.05	0.20
VOLATILES														
X1TETR	TETRACHLOROETHYLENE	ug/L	1	5	10	50.0	1	1	100.0	3.50	4.30	50.00	5.80	40.00
X1111T	1,1,1-TRICHLOROETHANE	ug/L	1	4	10	40.0	1	1	100.0	2.30	4.02	75.00	2.70	40.00
X1DCLE	1,1-DICHLOROETHENE	ug/L	1	2	10	20.0	1	1	100.0	1.56	2.61	14.00	6.10	40.00
81DIEE	DIETHYL ETHER	ug/L	1	1	10	10.0	1	1	100.0	1.28	2.19	12.00	12.00	40.00
X111CE	1,1-DICHLOROETHANE	ug/L	1	1	10	10.0	1	1	100.0	1.23	1.91	7.80	7.80	40.00
X112CE	1,2-DICHLOROETHANE	ug/L	1	1	10	10.0	1	1	100.0	1.10	1.37	2.70	2.70	40.00
X1CDCE	CIS-1,2-DICHLOROETHYLENE	ug/L	1	1	10	10.0	1	1	100.0	1.17	1.66	5.00	5.00	40.00
X1TRIC	TRICHLOROETHYLENE	ug/L	1	1	10	10.0	1	1	100.0	1.26	2.05	9.70	9.70	40.00

TABLE 5-12 a - GLOBAL SUMMARY OF CONTAMINANTS NOT DETECTED IN RAW SLUDGES

CONFIRMED		NOT CONFIRMED	
CONTAMINANT CODE	CONTAMINANT NAME	CONTAMINANT CODE	CONTAMINANT NAME
	BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS		
		PMPCRE	P-CRESOL*
P2AMET	AMETRYNE		
P2ATRA	ATRAZINE*		
P4DIAZ	DIAZINON*		
P4EPAR	PARATHION ETHYL*		
P4MALA	MALATHION*		
P4MPAR	METHYLPARATHION*		
PM24DP	2,4-DICHLOROPHENOL		
PM24DT	2,4-DINITROTOLUENE		
PM24MP	2,4-DIMETHYLPHENOL		
PM24NP	2,4-DINITROPHENOL*		
PM26DT	2,6-DINITROTOLUENE		
PM2NP	2-NITROPHENOL		
PM46DP	2-METHYL4,6-DINITROPHENOL		
PM4BPE	4-BROMOPHENYLPHENYLETHER		
PM4CPE	4-CHLOROPHENYLPHENYLETHER		
PM4NP	4-NITROPHENOL		
PMANAA	ALPHA-NAPHTHYLAMINE*		
PMBZEM	BIS(2-CHLORETHOXY)METHANE		
PMB2NE	BIS-(2-CHLOROMETHYL)ETHER		
PMBNAA	BETA-NAPHTHYLAMINE*		
PMDMP	DIMETHYL PHTHALATE		
PMNNP	N-NITROSO-DI-NPROPYLAMINE		
PMOCRE	O-CRESOL		
PMPCMC	P-CHLORO-M-CRESOL		
PN2CNA	CHLORONAPHTHALENE*		
PNACNE	ACENAPHTHENE*		
PNBAA	BENZO(A)ANTHRACENE		
PNBAP	BENZO(A)PYRENE		
PNBIPH	BIPHENYL		
PNBKF	BENZO(K)FLUORANTHENE		
PNDAHA	DIBENZO(A,H)ANTHRACENE*		
PNFLUO	FLUORENE		
PNGHIP	BENZO(G,H,I)PERYLENE*		
PNINP	IDENO(1,2,3-CD)PYRENE*		
PODICH	DICHLORAN*		
POTOC	TRI-O-CRESYL PHOSPHATE*		
X3001O	2-CHLOROPHENOL		
X3245	2,4,5-TRICHLOROPHENOL*		
X3246	2,4,6-TRICHLOROPHENOL		
	PENTACHLOROPHENOL		
	DIOXINS AND FURAN		
X3PCPH	TETRACHLORODIBENZODIOXIN*		
P94CDD	PENTACHLORODIBENZODIOXIN		
P95CDD	HEXACHLORODIBENZODIOXIN		
P96CDD			
	PESTICIDES, HERBICIDES, PCBS		
	PCNB		
P0PCNB	ELDRIN ALDEHYDE	P0CAPN	CAPTAN*
P1ENDA	MIREX PHOTO	X1HCBD	HEXACHLOROBUTADIENE*
P1PMIR	STROBANE*	X2HCE	HEXACHLOROETHANE
P1STRO	TOXAPHENE		
P1TOX			
	VOLATILES		
	1-OCTENE		
B1OCTE	VINYL BROMIDE*	X1ACRO	ACROLEIN
B1VBR	BROMODICHLOROBENZENE	X1ACRY	ACRYLONITRILE*
B2BDCL	DIETHYL ETHER		
E1DIEE	HEXANOL		
L1HEX	2-CHLOROETHYLVINYLETHER*		
PM2CEE	1,1,1-TRICHLOROETHANE		
X1111T	1,1,2,2-TETRACHLOROETHANE*		
X11122	1,1,2-TRICHLOROETHANE*		
X1112T	1,1-DICHLOROETHANE		
X111CE	1,2-DICHLOROETHANE		
X112CE	1,2-DICHLOROPROPANE		
X112CP	CIS-1,3-DICHLOROPROPENE		
X113DP	TRANS-1,3-DICHLOROPROPENE		
X113DR	ALPHA-CHLOROTOLUENE		
X1ACTO	BROMOETHANE*		
X1BETH	BROMOFORM*		
X1BROM	CIS-1,3-DICHLOROETHYLENE		
X1CDCE	CHLOROETHANE*		
X1CHLE	CHLOROMETHANE*		
X1CHLM	CARBON TETRACHLORIDE		
X1CTET			

* - NOT DECTECTED IN ANY STREAM TYPE AT ANY PLANT

TABLE 5-12 a - GLOBAL SUMMARY OF CONTAMINANTS NOT DETECTED IN RAW SLUDGES

CONFIRMED		NOT CONFIRMED	
CONTAMINANT CODE	CONTAMINANT NAME	CONTAMINANT CODE	CONTAMINANT NAME
	VOLATILES		
X1DCFM	DICHLORODIFLUOROMETHANE		
X1DCLE	1,1-DICHLOROETHENE		
X1T12D	TRI-1,2-DICHLOROETHYLENE*		
X1TCFM	TRICHLOROFLUOROMETHANE*		
X1TRIC	TRICHLOROETHYLENE		
X1VCL	VINYL CHLORIDE*		
X212CB	1,2-DICHLOROBENZENE		
X23CTO	3-CHLOROTOLUENE		
X2CBEN	CHLOROBENZENE		
X2CPPE	3-CHLOROPROPENE*		

* - NOT DECTECTED IN ANY STREAM TYPE AT ANY PLANT

TABLE 5-12 b - GLOBAL SUMMARY OF CONTAMINANTS IN RAW SLUDGES

CONTAM-INANT	CONTAMINANT NAME	UNITS (DRY WEIGHT)	QA/QC CODE	GLOBAL # SAMPS. DET.	GLOBAL # SAMPS. TESTED	GLOBAL % FREQ. DET.	GLOBAL # PLANTS DET.	GLOBAL # PLANTS	GLOBAL % PLANT PREV.	GLOBAL GEO. MEAN	GLOBAL SPREAD FACTOR	GLOBAL MAX. CONC.	GLOBAL MIN. CONC. > DL
CONVENTIONALS													
COD	CHEMICAL OXYGEN DEMAND	mg/kg	0	45	45	100.0	31	31	100.0	892221.45	3.19	2619047.62	4161.85
DOC	DISSOLVED ORGANIC CARBON	mg/kg	0	1	1	100.0	1	1	100.0	60606.06	0.00	60606.06	60606.06
NNO2PR	NITRITE,FILT. REACT.	mg/kg	0	1	1	100.0	1	1	100.0	6.90	0.00	6.90	6.90
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/kg	0	51	51	100.0	34	34	100.0	36897.85	2.98	74829.93	24.81
PH	(-LOG(H+(CONCN))	mg/kg	0	49	49	100.0	34	34	100.0	6.03	1.10	7.32	4.73
PPUT	PHOSPHORUS,UNFILT.TOTAL.	mg/kg	0	42	42	100.0	28	28	100.0	20347.70	4.43	68202.08	2.23
RST	RESIDUE, TOTAL.	mg/kg	0	51	51	100.0	34	34	100.0	32783.51	1.81	85800.00	6730.00
RSTLOI	RESIDUE,TOT.LOSS ON IGNI.	mg/kg	0	51	51	100.0	34	34	100.0	20803.05	1.77	51591.00	4370.00
NNHTPR	AMMONIUM,TOTAL FILT.REAC.	mg/kg	0	47	48	97.9	33	33	100.0	5911.32	4.59	18006.23	1097.42
NNOTPR	NITRATES,TOTAL FILT.REAC.	mg/kg	0	43	48	89.6	31	33	93.9	25.44	2.21	74.77	5.96
PHENOL	PHENOLICS (4AAP)	mg/kg	0	41	50	82.0	29	34	85.3	82.34	3.54	585.11	16.32
METALS													
ALUT	ALUMINUM,UNFIL.T.TOTAL.	mg/kg	0	51	51	100.0	34	34	100.0	9835.76	2.51	102040.82	2706.77
HGUT	MERCURY,UNFILT.TOTAL.	ug/kg	0	50	50	100.0	33	33	100.0	2.23	1.67	8.16	0.51
CUUT	COPPER,UNFIL.T.TOTAL.	mg/kg	0	46	46	100.0	33	33	100.0	606.31	1.72	4055.88	243.54
SRUT	STRONTIUM,UNFIL.T.TOTAL.	mg/kg	0	51	51	100.0	34	34	100.0	231.70	1.97	1206.90	36.13
ZNUT	ZINC,UNFIL.T.TOTAL.	mg/kg	0	51	51	100.0	34	34	100.0	905.39	2.39	16334.66	280.44
ASUT	ARSENIC,UNFILT.TOTAL.	mg/kg	0	50	51	98.0	33	34	97.1	6.13	2.01	41.50	2.25
CRUT	CHROMIUM,UNFILT.TOTAL.	mg/kg	0	50	51	98.0	33	34	97.1	301.43	3.68	8235.29	44.28
PBUT	LEAD,UNFIL.T.TOTAL.	mg/kg	0	48	49	98.0	31	32	96.9	173.99	2.24	5179.28	42.63
SEUT	SELENIUM,UNFILT.TOTAL.	mg/kg	0	48	50	96.0	31	33	93.9	3.04	1.93	22.90	0.93
NIUT	NICKEL,UNFILT.TOTAL.	mg/kg	0	44	46	95.7	28	30	93.3	59.17	2.90	2558.82	10.54
CDUT	CADMIUM,UNFILT.TOTAL.	mg/kg	0	40	43	93.0	27	30	90.0	9.74	4.35	183.67	1.37
AGUT	SILVER,UNFILT.TOTAL.	mg/kg	0	40	45	88.9	27	32	84.4	30.17	2.61	154.14	6.90
COUT	COBALT,UNFILT.TOTAL.	mg/kg	0	30	41	73.2	22	30	73.3	9.29	4.69	1838.01	3.58
MOUT	MOLYBDENUM,UNFILT.TOTAL.	mg/kg	0	23	37	62.2	18	28	64.3	5.80	2.88	256.41	2.32
CCNPUR	CYANIDE-FREE,UNFILT.REAC.	mg/kg	0	3	40	7.5	3	30	10.0	0.02	2.74	0.48	0.23
BEUT	BERYLLIUM,UNFILT.TOTAL.	mg/kg	0	1	25	4.0	1	24	4.2	0.50	3.55	1.01	1.01
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS													
PMMCRE	M-CRESOL	ug/kg	1	42	51	82.3	29	34	85.3	116847.30	12.16	9649056.60	232.80
PMPHEN	PHENOL	ug/kg	2	15	51	29.4	13	34	38.2	7312.80	3.00	76491.20	13702.60
PNNAPH	NAPHTHALENE	ug/kg	1	6	51	11.8	5	34	14.7	3823.30	3.75	12653061.20	3409.20
PNPHEN	PHENANTHRENE	ug/kg	1	6	51	11.8	6	34	17.7	3563.50	2.19	24316.50	3529.70
PMBBP	BUTYLBENZYLPHTHALATE	ug/kg	1	4	51	7.8	4	34	11.8	3445.60	2.25	48701.80	17087.40
PMB2IE	BIS(2-CHLOROISOPROPYL)ETHER	ug/kg	1	2	51	3.9	2	34	5.9	3464.00	3.02	958199.40	97130.20
PNCHRY	CHRYSENE	ug/kg	1	2	51	3.9	2	34	5.9	3026.90	1.93	21549.80	6584.00
PNFLAN	FLUORANTHENE	ug/kg	1	2	51	3.9	2	34	5.9	3083.50	1.97	27878.80	8350.60
PNPYR	PYRENE	ug/kg	1	2	51	3.9	2	34	5.9	4522.60	1.87	20740.70	8039.80
PMDPE	DIPHENYL ETHER	ug/kg	1	1	51	2.0	1	34	2.9	7296.10	1.81	14788.70	14788.70
PMNITB	NITROBENZENE	ug/kg	1	1	51	2.0	1	34	2.9	3405.40	3.60	10204081.60	10204081.60
PMNND	N-NITROSO-DI-PHENYLAMINE	ug/kg	1	1	51	2.0	1	34	2.9	2972.50	1.81	8530.30	8530.30
PNACNY	ACENAPHTHYLENE	ug/kg	1	1	51	2.0	1	34	2.9	4406.70	1.83	13187.30	13187.30
PNANTH	ANTHRACENE	ug/kg	1	1	51	2.0	1	34	2.9	2919.80	1.80	5484.70	5484.70
PNBBFA	BENZO(B)FLUORANTHENE	ug/kg	1	1	51	2.0	1	34	2.9	2924.20	1.82	7811.40	7811.40

TABLE 5-12 b - GLOBAL SUMMARY OF CONTAMINANTS IN RAW SLUDGES

CONTAM-INANT	CONTAMINANT NAME	UNITS (DRY WEIGHT)	QA/QC CODE	GLOBAL # SAMPS. DET.	GLOBAL # SAMPS. TESTED	GLOBAL % FREQ. DET.	GLOBAL # PLANTS DET.	GLOBAL # PLANTS	GLOBAL % PLANT PREV.	GLOBAL GEO. MEAN	GLOBAL SPREAD FACTOR	GLOBAL MAX. CONC.	GLOBAL MIN. CONC. > DL
DIOXINS AND FURANS													
P8CDD	OCTACHLORODIBENZODIOXIN	ug/kg	1	25	50	50.0	20	34	58.8	8.50	3.60	309.10	1.30
P7CDD	HEPTACHLORODIBENZODIOXIN	ug/kg	1	6	50	12.0	6	34	17.7	7.20	4.12	14.30	1.40
P8CDF	OCTACHLORODIBENZOFURAN	ug/kg	1	4	50	8.0	4	34	11.8	5.40	3.48	31.20	1.80
P4CDF	TETRACHLORODIBENZOFURAN	ug/kg	2	3	50	6.0	3	34	8.8	2.40	2.94	25.40	5.20
P5CDF	PENTACHLORODIBENZOFURAN	ug/kg	1	1	50	2.0	1	34	2.9	3.90	3.57	2.50	2.50
P6CDF	HEXACHLORODIBENZOFURAN	ug/kg	1	1	50	2.0	1	34	2.9	5.50	4.45	3.80	3.80
P7CDF	HEPTACHLORODIBENZOFURAN	ug/kg	1	1	50	2.0	1	34	2.9	7.20	4.98	25.30	25.30
PESTICIDES,HERBICIDES,PCBS													
P1PCBT	PCB, TOTAL	ug/kg	2	40	51	78.4	27	34	79.4	88.70	3.18	2895.60	19.50
P324D	2,4-DICHLOROPHENOXYACETIC ACID	ug/kg	3	38	51	74.5	28	34	82.3	93.20	6.50	3742.70	15.30
P1BHCG	GAMMA-BHC(HEXCHLORCYCLHEXANE)	ug/kg	2	28	51	54.9	23	34	67.7	8.90	2.69	101.00	4.70
P35TLV	SILVEX	ug/kg	3	23	51	45.1	19	34	55.9	47.30	3.40	1169.60	37.00
P1PPDE	PP-DDE	ug/kg	1	22	51	43.1	18	34	52.9	7.30	2.31	67.70	4.00
P245T	2,4,5-TRICLOROPHENOXYACETIC ACID	ug/kg	3	21	51	41.2	16	34	47.1	48.90	3.49	744.00	31.00
P1DIEL	DIELDRIN	ug/kg	2	20	51	39.2	17	34	50.0	7.20	3.10	259.70	5.40
P1CHLG	GAMMA-CHLORDANE	ug/kg	1	19	51	37.3	17	34	50.0	6.00	2.44	36.10	2.90
P1DMDT	METHOXYCHLOR	ug/kg	1	19	51	37.3	15	34	44.1	45.80	5.15	3179.70	17.80
P1BHCB	BETA-BHC (HEXCHLORCYCLHEXANE)	ug/kg	1	18	51	35.3	13	34	38.2	7.40	3.29	111.30	2.30
P1CHLA	ALPHA-CHLORDANE	ug/kg	1	18	51	35.3	16	34	47.1	5.90	2.38	34.00	2.30
X2124	1,2,4-TRICHLOROBENZENE	ug/kg	3	17	51	33.3	14	34	41.2	9.30	4.06	322.60	10.60
X2HCB	HEXACHLOROBENZENE	ug/kg	2	17	51	33.3	13	34	38.2	5.60	2.65	145.40	1.00
P1PPDD	PP-DDD	ug/kg	1	13	51	25.5	12	34	35.3	5.10	2.48	101.00	2.30
P1BHCA	ALPHA-BHC(HEXCHLORCYCLHEXANE)	ug/kg	1	12	51	23.5	12	34	35.3	5.50	2.74	53.60	2.30
P1HEPE	HEPTACHLOREPOXIDE	ug/kg	2	12	51	23.5	11	34	32.4	5.00	2.62	185.50	3.50
P1END1	ENDOSULFAN I	ug/kg	3	9	51	17.7	7	34	20.6	4.60	2.56	129.90	4.80
P1ENDR	ENDRIN	ug/kg	3	8	51	15.7	8	34	23.5	4.20	2.21	37.40	3.20
P1OCHL	OXYCHLORDANE	ug/kg	2	8	51	15.7	7	34	20.6	4.50	2.27	21.70	4.60
P1HEPT	HEPTACHLOR	ug/kg	3	7	51	13.7	7	34	20.6	4.50	2.83	101.00	1.00
P1ALDR	ALDRIN	ug/kg	1	6	51	11.8	6	34	17.7	4.60	2.50	49.80	4.30
P1END2	ENDOSULFAN II	ug/kg	3	6	51	11.8	6	34	17.7	4.20	2.38	48.20	4.80
P1END8	ENDOSULFAN SULPHATE	ug/kg	3	6	51	11.8	6	34	17.7	18.60	2.80	516.90	28.90
P1PPDT	PP-DDT	ug/kg	3	6	51	11.8	6	34	17.7	16.40	2.27	105.30	15.90
P1BHCD	DELTA-BHC(HEXCHLORCYCLHEXANE)	ug/kg	1	3	51	5.9	3	34	8.8	4.00	2.22	23.00	6.50
P1MIRX	MIREX	ug/kg	1	2	51	3.9	2	34	5.9	4.00	2.37	101.00	23.90
X1HCCP	HEXACHLOROCYCLOPENTADIENE	ug/kg	3	2	51	3.9	2	34	5.9	35.30	2.18	90.30	44.20
VOLATILES													
B2MPXY	M-, AND P-XYLENES	ug/kg	1	16	51	31.4	14	34	41.2	1345.90	3.86	47146.40	1776.00
X1CHLO	CHLOROFORM	ug/kg	1	12	51	23.5	12	34	35.3	1225.10	4.24	95238.10	1688.30
B2EBNZ	ETHYLBENZENE	ug/kg	1	10	51	19.6	9	34	26.5	890.70	2.60	24813.90	738.40
B2OXYL	O-XYLENE	ug/kg	1	8	51	15.7	8	34	23.5	841.60	2.51	14172.00	1096.90
X1TETR	TETRACHLOROETHYLENE	ug/kg	1	3	51	5.9	3	34	8.8	661.30	1.90	3162.80	1346.80
B2STYR	STYRENE	ug/kg	1	1	51	2.0	1	34	2.9	639.40	1.96	6010.90	6010.90
X1BDCM	BROMODICHLOROMETHANE	ug/kg	1	1	51	2.0	1	34	2.9	934.60	1.82	1749.50	1749.50
X1CDBM	CHLORODIBROMOMETHANE	ug/kg	1	1	51	2.0	1	34	2.9	641.20	1.99	7312.10	7312.10
X13CB	1,3-DICHLOROBENZENE	ug/kg	1	1	51	2.0	1	34	2.9	635.50	1.91	3970.20	3970.20
X14CB	1,4-DICHLOROBENZENE	ug/kg	1	1	51	2.0	1	34	2.9	643.70	2.00	7692.30	7692.30

percent of the samples. The most frequently detected pesticide and herbicide compound was detected in 78 percent of the samples and 16 of the pesticide/herbicide compounds were detected in more than 20 percent of samples.

5.3.9 Summary of Contaminants in Treated Sludges

Table 5-13(a) presents a list of the 81 contaminants that were not detected in any treated sludge samples from any WPCP, including 5 contaminants that were not confirmed. Also indicated are the 34 contaminants not detected in any sample type at any WPCP.

Fifteen metals and 64 organic compounds were detected in at least one treated sludge sample. Table 5-13(b) summarizes the contaminants detected in treated sludges. The most prevalent organic compounds were the pesticides and herbicides, with 10 compounds detected at more than 40 percent of the plants. The most prevalent base neutral and acid extractable and volatile compounds were detected at fewer than 35 percent of plants. One dioxin compound (Octachlorodibenzodioxin) was detected at 65 percent of the plants. There were 13 metals detected at more than 86 percent of the plants and 6 (Ag, Al, Cr, Cu, Sr and Zn) detected at all of the plants.

The most frequently detected contaminants were metals, with 13 metals detected in at least 82 percent of samples, and 6 detected in all the samples. None of the base neutral and acid extractable, or volatile compounds were detected in more than 30 percent of samples. One dioxin compound was detected in 53 percent of samples, and the remaining dioxins were detected in less than 20 percent. The most frequently detected pesticide and herbicide compound was detected in 68 percent of samples, and 16 of the pesticide/herbicide compounds were detected in more than 20 percent of the samples.

5.3.10 Summary of Contaminants Detected in Any Sample Type

Table 5-14 presents a summary of contaminants detected in any sample type. The Table provides for each of the five contaminant groups, the number of compounds detected, the maximum percentage prevalency (ie. the maximum percentage of all WPCPs in which the contaminant was identified) for any contaminant in the group and the maximum percentage frequency (ie. the maximum percentage of all samples of a given type in which the contaminant was identified) for any contaminant in the group.

As noted throughout Section 5.3 metals were the most prevalently (most WPCPs) and most frequently detected contaminants in all sample types.

TABLE 5-13 a - GLOBAL SUMMARY OF CONTAMINANTS NOT DETECTED IN TREATED SLUDGES

CONFIRMED		NOT CONFIRMED	
CONTAMINANT CODE	CONTAMINANT NAME	CONTAMINANT CODE	CONTAMINANT NAME
	METALS AND CYANIDE		
CCNFUR	CYANIDE-FREE,UNFILT.REAC.		
	BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS		
		PMPCRE	P-CRESOL*
P2AMET	AMETRYNE		
P2ATRA	ATRAZINE*		
P4DIAZ	DIAZINON*		
P4EPAR	PARATHION ETHYL*		
P4MALA	MALATHION*		
P4MPAR	METHYLPARATHION*		
PM24DP	2,4-DICHLOROPHENOL		
PM24DT	2,4-DINITROTOLUENE		
PM24MP	2,4-DIMETHYLPHENOL		
PM24NP	2,4-DINITROPHENOL*		
PM26DT	2,6-DINITROTOLUENE		
PM2NP	2-NITROPHENOL		
PM46DP	2-METHYL4,6-DINITROPHENOL		
PM4BPE	4-BROMOPHENYLPHENYLETHER		
PM4CPE	4-CHLOROPHENYLPHENYLETHER		
PM4NP	4-NITROPHENOL		
PMANAA	ALPHA-NAPHTHYLAMINE*		
PMB2EM	BIS(2-CHLORETHOXY)METHANE		
PMB2IE	BIS(2-CHLOROISOPROPYL)ETHER		
PMB2NE	BIS-(2-CHLOROMETHYL)ETHER		
PMBNAA	BETA-NAPHTHYLAMINE*		
PMDMP	DIMETHYL PHTHALATE		
PMOCRE	O-CRESOL		
PMPCMC	P-CHLORO-M-CRESOL		
PN2CNA	CHLORONAPHTHALENE*		
PNACNE	ACENAPHTHENE*		
PNBBFA	BENZO(B)FLUORANTHENE		
PNDAHA	DIBENZO(A,H)ANTHRACENE*		
PNGHIP	BENZO(G,H,I)PERYLENE*		
PNINP	IDENO(1,2,3-CD)PYRENE*		
PODICH	DICHLORAN*		
POTOC	TRI-O-CRESYL PHOSPHATE*		
X3001O	2-CHLOROPHENOL		
X3245	2,4,5-TRICHLOROPHENOL*		
X3246	2,4,6-TRICHLOROPHENOL		
X3PCPH	PENTACHLOROPHENOL		
	DIOXINS AND FURANS		
P94CDD	TETRACHLORODIBENZODIOXIN*		
P94CDF	TETRACHLORODIBENZOFURAN		
P96CDF	HEXACHLORODIBENZOFURAN		
P97CDF	HEPTACHLORODIBENZOFURAN		
P98CDF	OCTACHLORODIBENZOFURAN		
	PESTICIDES, HERBICIDES, PCBS		
P1ENDA	ELDRIN ALDEHYDE	P0CAPN	CAPTAN*
P1STRO	STROBANE*	X1HCBD	HEXACHLOROBUTADIENE*
P1TOX	TOXAPHENE		
	VOLATILES		
B1OCTE	1-OCTENE	X1ACRO	ACROLEIN
B1VBR	VINYL BROMIDE*	X1ACRY	ACRYLONITRILE*
B2BDCL	BROMODICHLOROBENZENE		
B2STYR	STYRENE		
E1DIEE	DIETHYL ETHER		
PM2CEE	2-CHLOROETHYLVINYLETHER*		
X11122	1,1,2,2-TETRACHLOROETHANE*		
X1112T	1,1,2-TRICHLOROETHANE*		
X111CE	1,1-DICHLOROETHANE		
X112CE	1,2-DICHLOROETHANE		
X112CP	1,2-DICHLOROPROPANE		
X113DP	CIS-1,3-DICHLOROPROPENE		
X113DR	TRANS-1,3-DICHLOROPROPENE		
X1ACTO	ALPHA-CHLOROTOLUENE		
X1BDCM	BROMODICHLOROMETHANE		
X1BETH	BROMOETHANE*		
X1BROM	BROMOFORM*		
X1CDCE	CIS-1,2-DICHLOROETHYLENE		
X1CHLE	CHLOROETHANE*		
X1CHLM	CHLOROMETHANE*		
X1CTET	CARBON TETRACHLORIDE		
X1DCFM	DICHLORODIFLUOROMETHANE		
X1DCLE	1,1-DICHLOROETHENE		

* - NOT DETECTED IN ANY STREAM TYPE AT ANY PLANT

TABLE 5-13 a - GLOBAL SUMMARY OF CONTAMINANTS NOT DETECTED IN TREATED SLUDGES

CONFIRMED		NOT CONFIRMED	
CONTAMINANT CODE	CONTAMINANT NAME	CONTAMINANT CODE	CONTAMINANT NAME
	VOLATILES		
X1T12D	TRI-1,2-DICHLOROETHYLENE*		
X1TCFM	TRICHLOROFLUOROMETHANE*		
X1VCL	VINYL CHLORIDE*		
X212CB	1,2-DICHLOROBENZENE		
X213CB	1,3-DICHLOROBENZENE		
X23CTO	3-CHLOROTOLUENE		
X2CBEN	CHLOROBENZENE		
X2CPPE	3-CHLOROPROPENE*		

* - NOT DETECTED IN ANY STREAM TYPE AT ANY PLANT

TABLE 5-13b - GLOBAL SUMMARY OF CONTAMINANTS IN TREATED SLUDGES

CONTAM-INANT	CONTAMINANT NAME	UNITS (DRY WEIGHT)	QA/QC CODE	GLOBAL # SAMPS. DET.	GLOBAL # SAMPS. TESTED	GLOBAL % FREQ. DET.	GLOBAL # PLANTS DET.	GLOBAL # PLANTS	GLOBAL % PLANT PREV.	GLOBAL GEO. MEAN	GLOBAL SPREAD FACTOR	GLOBAL MAX. CONC.	GLOBAL MIN. CONC. > DL
CONVENTIONALS													
COD	CHEMICAL OXYGEN DEMAND	mg/kg	0	36	36	100.0	29	29	100.0	508097.94	4.65	2483375.96	2760.08
NNHTPR	AMMONIUM,TOTAL FILT.REAC.	mg/kg	0	25	25	100.0	19	19	100.0	17658.28	2.92	269683.26	1419.58
NNTKUR	NITROGEN-TOT-KJEL,UNP.TOT	mg/kg	0	49	49	100.0	34	34	100.0	38494.12	1.77	294117.65	14400.02
PH	(-LOG(H+(CONCN))	mg/kg	0	47	47	100.0	34	34	100.0	7.17	1.09	9.84	5.70
PPUT	PHOSPHORUS,UNFILT.TOTAL.	mg/kg	0	43	43	100.0	29	29	100.0	76638.67	6.91	16094159.99	19410.00
RST	RESIDUE, TOTAL.	mg/kg	0	50	50	100.0	34	34	100.0	80434.04	3.23	479900.00	2210.00
RSTLOI	RESIDUE,TOT.LOSS ON IGNI.	mg/kg	0	50	50	100.0	34	34	100.0	43379.33	3.19	240560.00	1180.00
NNOTHR	NITRATES,TOTAL FILT.REAC.	mg/kg	0	23	26	88.5	19	20	95.0	42.68	2.29	565.61	9.24
PHNOL	PHENOLICS (4AAP)	mg/kg	0	41	49	83.7	29	33	87.9	43.05	3.14	1062.50	6.80
METALS													
AGUT	SILVER,UNFILT.TOTAL.	mg/kg	0	44	44	100.0	30	30	100.0	37.78	2.33	240.73	2.30
ALUT	ALUMINUM,UNFILT.TOTAL.	mg/kg	0	50	50	100.0	34	34	100.0	10715.94	2.82	81967.21	391.42
CRUT	CHROMIUM,UNFILT.TOTAL.	mg/kg	0	50	50	100.0	34	34	100.0	333.06	3.59	7488.15	5.45
CUUT	COPPER,UNFILT.TOTAL.	mg/kg	0	45	45	100.0	33	33	100.0	732.24	2.16	4962.09	58.24
SRUT	STRONTIUM,UNFILT.TOTAL.	mg/kg	0	50	50	100.0	34	34	100.0	240.93	2.54	1366.46	6.25
ZNUT	ZINC,UNFILT.TOTAL.	mg/kg	0	50	50	100.0	34	34	100.0	988.90	2.57	15126.05	52.05
ASUT	ARSENIC,UNFILT.TOTAL.	mg/kg	0	49	50	98.0	33	34	97.1	5.40	2.06	23.56	0.43
HGUT	MERCURY,UNFILT.TOTAL.	ug/kg	0	49	50	98.0	33	34	97.1	3.24	2.04	33.74	0.77
PBUT	LEAD,UNFILT.TOTAL.	mg/kg	0	49	50	98.0	33	34	97.1	196.62	2.46	4537.82	10.23
SEUT	SELENIUM,UNFILT.TOTAL.	mg/kg	0	48	50	96.0	33	34	97.1	2.67	2.98	22.49	0.10
NIUT	NICKEL,UNFILT.TOTAL.	mg/kg	0	42	45	93.3	27	30	90.0	72.95	2.95	2393.36	6.26
CDUT	CADMIUM,UNFILT.TOTAL.	mg/kg	0	41	45	91.1	28	31	90.3	10.47	3.98	175.64	1.73
COUT	COBALT,UNFILT.TOTAL.	mg/kg	0	32	39	82.1	24	28	85.7	9.14	2.75	38.35	2.34
MOUT	MOLYBDENUM,UNFILT.TOTAL.	mg/kg	0	23	34	67.7	18	26	69.2	6.41	2.84	83.33	1.32
BEUT	BERYLLIUM,UNFILT.TOTAL.	mg/kg	0	1	26	3.9	1	24	4.2	0.47	3.32	0.63	0.63
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS													
PM4CRE	M-CRESOL	ug/kg	1	15	50	30.0	12	34	35.3	5281.80	8.20	2211895.90	7750.00
PNPHEN	PHENANTHRENE	ug/kg	1	12	50	24.0	9	34	26.5	2220.50	4.27	28235.30	2868.50
PMBBP	BUTYLBENZYLPHTHALATE	ug/kg	1	8	50	16.0	6	34	17.7	1916.90	5.23	914498.10	1673.60
PNNAPH	NAPHTHALENE	ug/kg	1	6	50	12.0	5	34	14.7	1545.60	3.77	25585.80	2389.10
PNCHRY	CHRYSENE	ug/kg	1	4	50	8.0	4	34	11.8	1475.50	3.39	13852.20	971.00
PNFLAN	FLUORANTHENE	ug/kg	1	4	50	8.0	3	34	8.8	1338.90	4.26	22097.60	8.20
PMNITB	NITROBENZENE	ug/kg	1	3	50	6.0	3	34	8.8	1405.80	3.46	17400.90	6398.20
PMPHEN	PHENOL	ug/kg	2	3	50	6.0	3	34	8.8	2108.80	3.65	31126.40	15558.70
PNFLUO	FLUORENE	ug/kg	1	3	50	6.0	3	34	8.8	1352.10	3.25	4947.20	2601.70
PNPYR	PYRENE	ug/kg	1	3	50	6.0	3	34	8.8	2124.30	3.44	18799.50	9243.70
PMDPE	DIPHENYL ETHER	ug/kg	1	2	50	4.0	2	34	5.9	3222.10	3.37	30000.00	15083.70
PNBAA	BENZO(A)ANTHRACENE	ug/kg	1	2	50	4.0	2	34	5.9	1379.50	3.41	14511.90	6666.70
PMNND	N-NITROSO-DI-PHENYLAMINE	ug/kg	1	1	50	2.0	1	34	2.9	1276.20	3.35	12471.40	12471.40
PMNNP	N-NITROSO-DI-NPROPYLAMINE	ug/kg	1	1	50	2.0	1	34	2.9	1355.60	3.39	17475.70	17475.70
PNACNY	ACENAPHTHYLENE	ug/kg	1	1	50	2.0	1	34	2.9	1909.40	3.26	6142.90	6142.90
PNANTH	ANTHRACENE	ug/kg	1	1	50	2.0	1	34	2.9	1306.60	3.21	3957.80	3957.80
PNBAP	BENZO(A)PYRENE	ug/kg	1	1	50	2.0	1	34	2.9	1333.30	3.30	10883.90	10883.90
PNBIPH	BIPHENYL	ug/kg	1	1	50	2.0	1	34	2.9	1890.80	3.26	6255.20	6255.20
PNBKF	BENZO(K)FLUORANTHENE	ug/kg	1	1	50	2.0	1	34	2.9	1350.20	3.39	20448.50	20448.50

TABLE 5-13b - GLOBAL SUMMARY OF CONTAMINANTS IN TREATED SLUDGES

CONTAM-INANT	CONTAMINANT NAME	UNITS (DRY WEIGHT)	QA/QC CODE	GLOBAL # SAMPS. DET.	GLOBAL # SAMPS. TESTED	GLOBAL % FREQ. DET.	GLOBAL # PLANTS DET.	GLOBAL # PLANTS	GLOBAL % PLANT PREV.	GLOBAL GEO. MEAN	GLOBAL SPREAD FACTOR	GLOBAL MAX. CONC.	GLOBAL MIN. CONC. > DL
DIOXINS AND FURANS													
P8CDD	OCTACHLORODIBENZODIOXIN	ug/kg	1	26	49	53.1	22	34	64.7	7.10	3.84	303.60	0.60
P7CDD	HEPTACHLORODIBENZODIOXIN	ug/kg	1	10	49	20.4	8	34	23.5	5.00	3.21	72.60	1.40
P6CDD	HEXACHLORODIBENZODIOXIN	ug/kg	2	2	49	4.1	2	34	5.9	2.40	3.52	3.80	1.10
P5CDD	PENTACHLORODIBENZODIOXIN	ug/kg	2	1	49	2.0	1	34	2.9	3.20	6.14	1.30	1.30
P5CDF	PENTACHLORODIBENZOPURAN	ug/kg	1	1	49	2.0	1	34	2.9	2.50	5.12	1.60	1.60
PESTICIDES,HERBICIDES,PCBS													
P1PPDE	PP-DDE	ug/kg	1	34	50	68.0	25	34	73.5	11.10	2.72	164.80	3.60
P1PCBT	PCB, TOTAL	ug/kg	2	32	50	64.0	23	34	67.7	114.10	4.58	5592.10	34.10
P24D	2,4-DICHLOROPHENOXYACETIC ACID	ug/kg	3	25	50	50.0	22	34	64.7	75.00	5.81	2792.70	11.30
P1CHLA	ALPHA-CHLORDANE	ug/kg	1	22	50	44.0	19	34	55.9	6.50	2.41	36.50	4.20
X2124	1,2,4-TRICHLOROBENZENE	ug/kg	3	22	50	44.0	18	34	52.9	14.80	5.02	784.70	12.90
P1CHLG	GAMMA-CHLORDANE	ug/kg	1	21	50	42.0	18	34	52.9	6.80	2.58	38.00	4.90
X2HCB	HEXACHLOROBENZENE	ug/kg	2	21	50	42.0	19	34	55.9	7.00	2.96	123.70	1.10
P1BHCB	BETA-BHC (HEXCHLORCYCLOHEXANE)	ug/kg	1	19	50	38.0	16	34	44.1	92.70	2.94	1264.80	16.80
P3SILV	SILVEX	ug/kg	3	18	50	36.0	15	34	41.2	84.40	3.13	1443.30	28.10
P3245T	2,4,5-TRICLORPHENOXYACETIC ACID	ug/kg	3	16	50	32.0	14	34	38.2	6.50	3.51	384.20	5.80
P1DIEL	DIELDRIN	ug/kg	2	15	50	30.0	13	34	38.2	34.10	4.42	7633.60	21.20
P1DMDT	METHOXYCHLOR	ug/kg	1	15	50	30.0	13	34	38.2	5.70	3.13	107.40	5.00
P1BHCG	GAMMA-BHC(HEXCHLORCYCLOHEXANE)	ug/kg	2	12	50	24.0	12	34	35.3	5.30	2.67	77.60	9.60
P1ALDR	ALDRIN	ug/kg	1	11	50	22.0	9	34	26.5	5.60	3.00	77.80	4.20
P1BHCA	ALPHA-BHC(HEXCHLORCYCLOHEXANE)	ug/kg	1	11	50	22.0	11	34	32.4	5.20	2.86	242.70	4.90
P1HEPE	HEPTACHLOREPOXIDE	ug/kg	2	10	50	20.0	8	34	23.5	4.70	2.20	28.10	6.80
P1HEPT	HEPTACHLOR	ug/kg	3	9	50	18.0	8	34	23.5	4.70	2.52	80.80	7.90
P1MIRX	MIREX	ug/kg	1	8	50	16.0	6	34	17.7	4.90	2.52	639.70	27.60
X1HCCP	HEXACHLOROCYCLOPENTADIENE	ug/kg	3	8	50	16.0	8	34	23.5	34.20	2.76	81.30	12.30
P1END2	ENDOSULFAN II	ug/kg	3	7	50	14.0	7	34	20.6	4.70	2.67	68.20	8.10
P1PPDD	PP-DDD	ug/kg	1	7	50	14.0	7	34	20.6	4.60	2.47	113.60	12.10
P1END1	ENDOSULFAN I	ug/kg	3	6	50	12.0	4	34	11.8	4.90	2.96	362.60	35.20
P1END6	ENDOSULFAN SULPHATE	ug/kg	3	6	50	12.0	6	34	17.7	17.50	2.53	26.70	8.10
P1OCHL	OXYCHLORDANE	ug/kg	2	6	50	12.0	6	34	17.7	4.20	2.24	56.80	4.70
P1ENDR	ENDRIN	ug/kg	3	5	50	10.0	5	34	14.7	4.20	2.36	181.80	24.30
P1PPDT	PP-DDT	ug/kg	3	5	50	10.0	5	34	14.7	16.70	2.14	62.70	60.00
P0PCNB	PCNB	ug/kg	2	2	22	9.1	2	14	14.3	22.60	1.51	11.50	2.50
P1BHCD	DELTA-BHC(HEXCHLORCYCLOHEXANE)	ug/kg	1	4	50	8.0	4	34	11.8	3.90	1.93	85.40	16.00
P1PMIR	MIREX PHOTO	ug/kg	2	2	50	4.0	2	34	5.9	3.90	2.25	11.50	11.50
X2HCE	HEXACHLOROETHANE	ug/kg	3	1	50	2.0	1	34	2.9	3.70	1.94		
VOLATILES													
B2MPXY	M-, AND P-XYLENES	ug/kg	1	15	50	30.0	11	34	32.4	816.00	7.11	1416961.90	626.60
B2EBNZ	ETHYLBENZENE	ug/kg	1	14	50	28.0	11	34	32.4	606.50	5.59	500104.20	181.40
B2OXYL	O-XYLENE	ug/kg	1	14	50	28.0	11	34	32.4	523.50	4.05	37037.00	268.40
X1CHLO	CHLOROFORM	ug/kg	1	12	50	24.0	12	34	35.3	441.70	4.33	12937.10	7.60
X1TETR	TETRACHLOROETHYLENE	ug/kg	1	2	50	4.0	2	34	5.9	285.40	3.51	3359.40	2839.50
X214CB	1,4-DICHLOROBENZENE	ug/kg	1	2	50	4.0	2	34	5.9	272.70	3.28	2643.70	220.00
L1HEX	HEXANOL	ug/kg	2	1	50	2.0	1	34	2.9	11979.20	14.28	143678.20	143678.20
X1111T	1,1,1-TRICHLOROETHANE	ug/kg	1	1	50	2.0	1	34	2.9	254.90	3.34	2323.20	2323.20
X1CDBM	CHLORODIBROMOMETHANE	ug/kg	1	1	50	2.0	1	34	2.9	264.10	3.53	6634.30	6634.30
X1TRIC	TRICHLOROETHYLENE	ug/kg	1	1	50	2.0	1	34	2.9	261.30	3.24	937.50	937.50

Table 5-14
SUMMARY OF CONTAMINANTS DETECTED IN ANY SAMPLE TYPE

Sample Type	No. Plants	No. Samples (1)	Metals and Cyanide			Base Neutral and Acid Extractable			Dioxin/Furan (2)			Pesticides and Herbicides			Volatiles		
			No. Det. (3)	Max % Plant Prev.	Max % Freq. Det.	No. Det. (3)	Max % Plant Prev.	Max % Freq. Det.	No. Det. (3)	Max % Plant Prev.	Max % Freq. Det.	No. Det. (3)	Max % Plant Prev.	Max % Freq. Det.	No. Det. (3)	Max % Plant Prev.	Max % Freq. Det.
Raw Sewage	37	275	15	100	99.7	31	86.5	60.7	3	10.8	7.4	29	100	77.5	22	37.8	15.7
Primary Effluent	7	39	14	100	100	6	71.4	46.2	2	26.8	25.0	16	85.7	72.5	12	85.7	55.3
Lagoon Effluent (4)	2	12	10	100	100	0	-	-	0	-	-	7	100	100	0	-	-
Secondary Effluent	28	224	15	100	100	24	14.3	3.1	4	14.3	9.1	24	100	78.0	19	64.3	16.5
Tertiary Effluent (4)	1	10	13	100	100	15	100	30.0	0	-	-	8	100	90.0	9	100	50.0
Raw Sludge (2)	34	51	16	100	100	15	85.3	82.3	7	58.5	50.0	27	79.4	78.4	10	41.2	31.4
Treated Sludge (2)	34	50	15	100	100	19	35.3	30.0	5	64.7	53.1	30	73.5	68.0	10	32.4	30.0

Notes:

(1) The number of samples may vary depending on compound group. The number given is representative of most compound groups. Refer to Table 5-4(a) - 5-10(a) for exact numbers.

(2) Samples are 5-day composites.

(3) The number of contaminants detected in the sample type.

(4) Summary data for lagoon and tertiary effluents is included for the sake of completeness. Due to the small number of facilities sampled, this data should be interpreted with caution.

(KIR18/285W)

Only 5 base neutral and acid extractable compounds (M-cresol, Phenol, Phenanthrene, Butylbenzl phthalate and Naphthalene) were detected at more than 20% of the plants studied for any sample type. With the exception of the 5 compounds, base neutral and acid extractable compounds were detected at a maximum of 14 percent of plants and in a maximum of 8 percent of samples, for all sample types. Interestingly, the maximum prevalency and frequency of detection of base/neutral acid extractable compounds in all secondary effluent samples was substantially smaller than in the raw sewage, primary effluent or sludge sample types.

The maximum frequency of detection and prevalency of dioxins and furans was relatively low in raw sewage and in primary and secondary effluent streams. In contrast, the number of dioxin/furan compounds detected, and the maximum frequency of detection and prevalency were markedly greater in sludge streams.

Approximately the same number of compounds in the pesticide/herbicide group were detected in raw sewage, secondary effluent and raw treated sludge streams. About 50 percent fewer compounds were detected in primary effluents. This may be attributable to a lower number of primary plants monitored. The maximum frequency of detection and prevalency is quite large and reasonably uniform for all sample types.

The largest number of volatile compounds were detected in the raw sewage and secondary effleunt streams. Maximum frequency of detection and prevalency were quite variable among the sample types ranging from 32 percent to 85 percent prevalency and 15 percent to 55 percent frequency of detection.

6.0 SUMMARY

This interim report on the WPCP Pilot Monitoring Study was prepared to present the study program methodology and the analytical data in conjunction with the QA/QC results. Also included are the individual plant information summaries (Appendix A).

The final report will present a more detailed review and analysis of the study results. More specifically, the report will include the following:

- An assessment of the impact of industrial, residential and sanitary sewer inputs on the nature and loadings of HCs observed in the raw wastewaters and sludges.
- An estimate of HC loadings discharged in the sludges and liquid effluents of the 37 WPCPs.
- An assessment of the ability of WPCPs to remove HCs and identification of the factors affecting HC removal efficiency.
- A prioritized list of contaminants observed at the 37 WPCPs.
- The major concerns affecting the implementation of the monitoring regulation and recommendations to address problem areas.

7.0 REFERENCES

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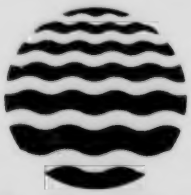
Volume

2

STOPPING WATER POLLUTION AT ITS SOURCE



MISA

Municipal/Industrial Strategy for Abatement

THIRTY SEVEN MUNICIPAL WATER POLLUTION CONTROL PLANTS

PILOT MONITORING STUDY

VOLUME II

APPENDIX "A"

DECEMBER 1988

Environment Ontario

Jim Bradley
Minister

ISBN 0-7729-4901-8

THIRTY SEVEN
MUNICIPAL WATER POLLUTION CONTROL PLANTS

Pilot Monitoring Study

Volume II
Appendix 'A'
Individual Plant Reports

Prepared for:
Ontario Ministry of the Environment
Water Resources Branch

Prepared by:
Canviro Consultants

December 1988

c Queen's Printer for Ontario, 1988

APPENDIX A

INDIVIDUAL PLANT DATA

Appendix A

INDIVIDUAL PLANT DATA

A-1 Belle River (Maidstone) WPCP
A-2 Brantford WPCP
A-3 Burlington (Skyway) WPCP
A-4 Cornwall WPCP
A-5 Grimsby (Baker Road) WPCP
A-6 Guelph WPCP
A-7 Hamilton (Woodward) WPCP
A-8 Kingston City WPCP
A-9 Kingston Twp. WPCP
A-10 Kitchener WPCP
A-11 Lindsay Lagoon
A-12 London (Greenway) WPCP
A-13 London (Pottersburg) WPCP
A-14 Mississauga (Clarkson)
A-15 Mississauga (Lakeview)
A-16 Moore (Corunna)
A-17 Niagara Falls (Stamford) WPCP
A-18 Niagara-on-the-Lake Lagoon
A-19 Oakville (Southeast) WPCP
A-20 Ottawa (Green Creek) WPCP
A-21 Paris WPCP
A-22 Peterborough WPCP
A-23 Pickering (Duffin Creek) WPCP
A-24 Sarnia WPCP
A-25 Sault Ste. Marie (East) WPCP
A-26 Sault Ste. Marie (West) WPCP
A-27 Sudbury WPCP
A-28 Thunder Bay WPCP
A-29 Toronto (Highland Creek) WPCP
A-30 Toronto (Humber) WPCP
A-31 Toronto (Main) WPCP
A-32 Toronto (North) WPCP
A-33 Waterloo WPCP
A-34 Wallaceburg WPCP
A-35 Windsor (Little River) WPCP
A-36 Windsor (Westerly) WPCP
A-37 Whitby (Pringle Creek #1) WPCP

Plant Schematic with Design Characteristics

Design data for each WPCP was developed from existing documentation supplemented by onsite measurements and discussions with operating staff.

The preponderance of design data collection was carried out at the time of the pre-monitoring inspection, although, in most cases subsequent investigation was not necessary.

WPWP Performance Data

WPCP performance data (BOD, TSS, TP) were abstracted from a prior MOE report entitled "Phosphorus Removal Upgrading at Wastewater Treatment Facilities in the Great Lakes Basin - Phase I Report", November, 1986. The source of the influent and effluent data used for these Tables was the Ontario Ministry of the Environment database for discharges from municipal wastewater treatment facilities in Ontario.

Presented in the Tables is a statistical comparison of effluent BOD, TSS and TP concentrations to the 5 year average value. These comparisons were only valid if monthly average data was available for all 5 years. Otherwise, it was indicated in a Table that insufficient data was available for the comparisons.

Operational Evaluations

Data sheets are presented in this Appendix which present the operational data for the two week presampling period and the sampling period. This information was collected from WPCP daily operating summaries and supplemented as necessary by additional sampling.

Raw Wastewater Components

The relative contributions of domestic, commercial industrial and inflow-infiltration flow sources to the raw wastewater observed at each study WPCP was investigated in a separate MOE project. At the time of the study, very few industries monitored their flows discharged into municipal sewage treatment plant. As a result, industrial flows received at the treatment plant were estimated indirectly from their annual water use. It was assumed that on the average, 85% of the water purchased were returned to the sewer, over 250 days in a year.

Due to various difficulties, water use could not be obtained for all industries. Consequently, percent industrial flows received are generally underestimated. A summary table of sources of raw sewage was prepared for each WPCP and is presented in Appendix A. These tables provide an estimate

reported water use data, and where the information was available, the top 5 industiral sectors based on available water use data.

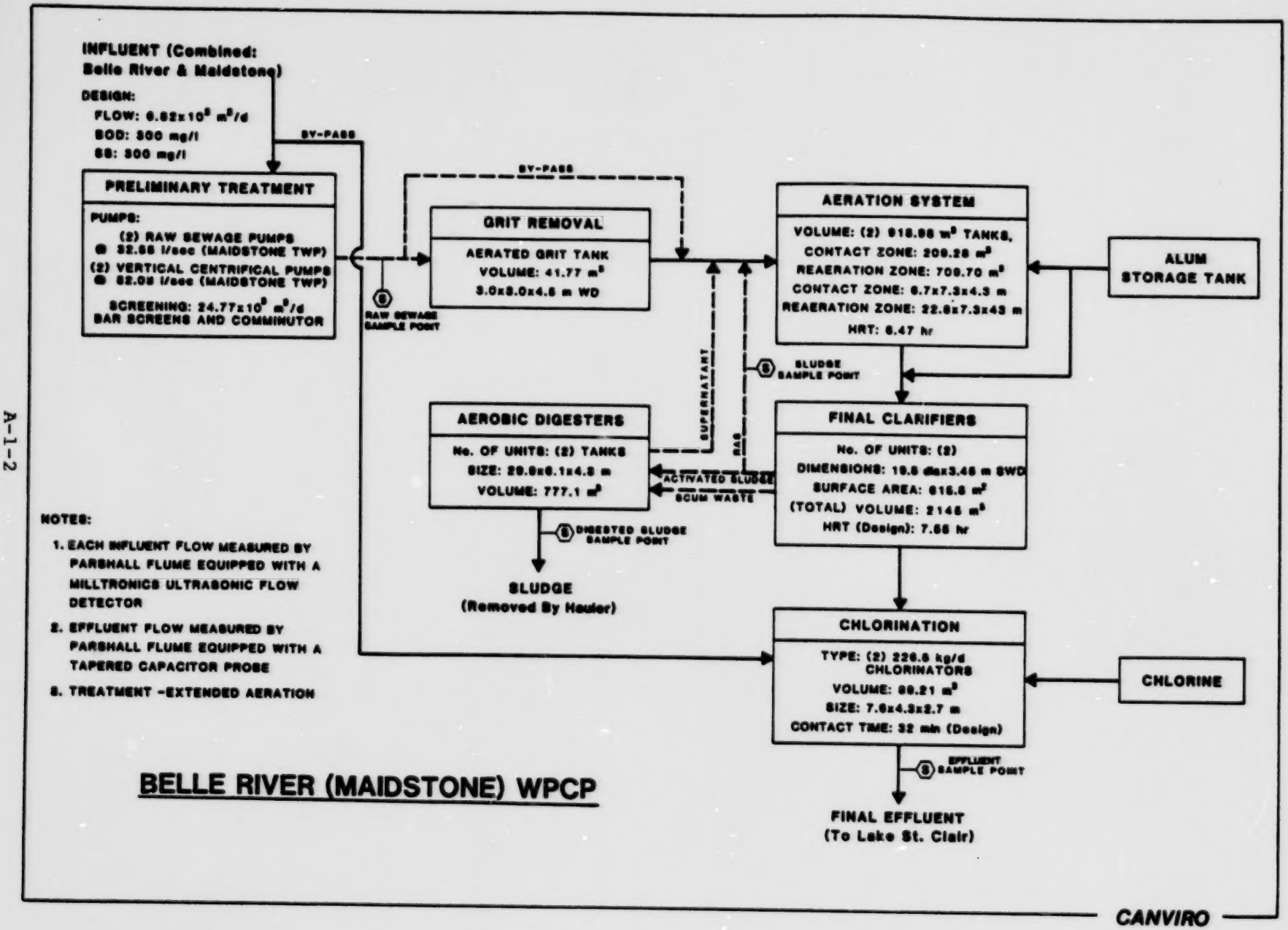
The results of this investigation were very approximate but have been included in Appendix A because no other data was available.

Sub-Appendix A-1

Belle River (Maidstone) WPCP

Contents:

- Plant Schematic with Design Characteristics
- Annual Data Review (1981 - 1986 Plant Performance)
- Sources of Municipal Water Pollution Control Plant Raw Sewage
- Operational Evaluation for Belle River (Maidstone) WPCP
- Analytical Data


INFLUENT (Combined:
Belle River & Maidstone)
DESIGN:
FLOW: 6.82x10⁵ m³/d
BOD: 300 mg/l
SS: 300 mg/l
BY-PASS
PRELIMINARY TREATMENT
PUMPS:
(2) RAW SEWAGE PUMPS @ 32.56 l/sec (MAIDSTONE TWP)
(2) VERTICAL CENTRIFICAL PUMPS @ 82.09 l/sec (MAIDSTONE TWP)
SCREENING: 24.77x10³ m³/d
BAR SCREENS AND COMMINUTOR
RAW SEWAGE SAMPLE POINT
BY-PASS
GRIT REMOVAL
AERATED GRIT TANK
VOLUME: 41.77 m³
3.0x3.0x4.6 m WD
AERATION SYSTEM
VOLUME: (2) 918.98 m³ TANKS,
CONTACT ZONE: 209.28 m³
REAERATION ZONE: 709.70 m³
CONTACT ZONE: 6.7x7.3x4.3 m
REAERATION ZONE: 22.6x7.3x43 m
HRT: 6.47 hr
ALUM STORAGE TANK
SLUDGE SAMPLE POINT
SUPERNATANT
RAS
AEROBIC DIGESTERS
No. OF UNITS: (2) TANKS
SIZE: 29.6x6.1x4.8 m
VOLUME: 777.1 m³
ACTIVATED SLUDGE
SCUM WASTE
FINAL CLARIFIERS
No. OF UNITS: (2)
DIMENSIONS: 19.8 dia x3.46 m SWD
SURFACE AREA: 615.6 m²
(TOTAL) VOLUME: 2148 m³
HRT (Design): 7.86 hr
DIGESTED SLUDGE SAMPLE POINT
SLUDGE
(Removed By Hauler)
CHLORINATION
TYPE: (2) 226.6 kg/d CHLORINATORS
VOLUME: 89.21 m³
SIZE: 7.6x4.3x2.7 m
CONTACT TIME: 32 min (Design)
CHLORINE
EFFLUENT SAMPLE POINT
FINAL EFFLUENT
(To Lake St. Clair)
NOTES:
1. EACH INFLUENT FLOW MEASURED BY PARSHALL FLUME EQUIPPED WITH A MILLTRONICS ULTRASONIC FLOW DETECTOR
2. EFFLUENT FLOW MEASURED BY PARSHALL FLUME EQUIPPED WITH A TAPERED CAPACITOR PROBE
3. TREATMENT -EXTENDED AERATION
BELLE RIVER (MAIDSTONE) WPCP
CANVIRO

BELLE RIVER - MAIDSTONE WPCP
Extended Aeration -
Phosphorus Removal - Continuous
Capacity - 6.819 10(3)m3/day

PARAMETER	1981	1982	1983	1984	1985	MEAN ANNUAL AVERAGE
Avg. Daily Flow (1000 m3/day)	3.80	4.65	5.35	5.00	6.35	5.03
BOD5 - Influent (mg/L)	67.71	77.70	67.83	80.00	78.75	74.40
BOD5 - Effluent (mg/L)	8.99	8.82	8.82	6.60	4.92	7.47
Annual BOD5 Significantly Different from Mean Annual Average BOD5?	Y	N	N	N	Y	
TSS - Influent (mg/L)	67.18	80.93	89.95	105.67	91.75	87.89
TSS - Effluent (mg/L)	10.85	12.15	11.90	11.06	11.04	11.40
Annual TSS Significantly Different from Mean Annual Average TSS?	N	N	N	N	N	
Total P - Influent (mg/L)	2.87	2.92	2.38	2.74	3.17	2.66
Total P - Effluent (mg/L)	0.40	0.36	0.40	0.62	0.85	0.52
Annual TP Significantly Different from Mean Annual Average TP?	N	N	N	N	Y	
TP in Compliance?	Y	Y	Y	Y	Y	Y

I.D. - Insufficient Data

SOURCES OF MUNICIPAL WATER POLLUTION CONTROL PLANT RAW SEWAGE

GENERAL DESCRIPTION OF WATER POLLUTION CONTROL PLANT (WPCP)

NAME OF WPCP	BELLE RIVER-MAIDSTONE WPCP
WORKS NUMBER	110002078
TREATMENT TYPE	EXTENDED AERATION PHOSPHORUS REMOVAL CONTINUOUS
DESIGN CAPACITY (1000 m3/d)	6.819
1986 AVERAGE DAY FLOW (1000 m3/d)	6.868
POPULATION SERVED	7581

% OF TOTAL FLOW ATTRIBUTED TO:

INDUSTRIAL SOURCES (%)	NOT ESTIMATED
COMMERCIAL SOURCES (%) (Population x 0.0757)	8
RESIDENTIAL SOURCES (%) (Population x 0.175)	19
UNACCOUNTED FOR, INCL. INFILTRATION (100-% Contributed from industrial, commercial and residential sources)	72

PROFILE OF INDUSTRIES IN CATCHMENT

TOTAL NO OF INDUSTRIES	20
INDUSTRIES WITH WATER	0
NO OF SIC CATEGORIES	9

DESCRIPTION OF THE TOP 5 INDUSTRIES DISCHARGED TO THE WPCP (BASED ON WATER USE DATA)

DESCRIPTION	SIC	# OF COMPANIES

OPERATIONAL EVALUATION FOR: BELLE RIVER (MAIDSTONE) WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: Feb. 6, 1988
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: 6,820 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
RAW SEWAGE FLOW	5,970	6,140	5,560	5,290	5,480	5,150	5,590
% of Design Flow	87.54%	90.03%	81.52%	77.57%	80.35%	75.51%	81.96%
Influent BOD (mg/L)		72.0	70.0				
Primary BOD (mg/L)		72.0	70.0				
Secondary BOD (mg/L)		3.4	5.0				
% PRIMARY REMOVAL		0.0	0.0				
% SECONDARY REMOVAL		95.3	92.9				
Influent SS (mg/L)	93.0	59.0	69.0		78.0		
Primary SS (mg/L)	93.0	59.0	69.0		78.0		
Secondary SS (mg/L)	18.0	9.0	9.2		12.0		
% PRIMARY REMOVAL	0.0	0.0	0.0		0.0		
% SECONDARY REMOVAL	80.6	84.7	86.7		84.6		
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)		25.0					
Primary TKN (mg/L)							
Secondary TKN (mg/L)		1.3					
% PRIMARY REMOVAL							
% SECONDARY REMOVAL		94.8					
Influent Total P (mg/L)		3.30					
Primary Total P (mg/L)							
Secondary Total P (mg/L)		0.54					
% PRIMARY REMOVAL							
% SECONDARY REMOVAL		83.6					

OPERATIONAL EVALUATION FOR: BELLE RIVER (MAIDSTONE) WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: Feb. 6, 1988
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: 6,820 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 8	DAY 9	DAY 10	DAY 11	DAY 12	DAY 13	DAY 14
RAW SEWAGE FLOW	5,410	5,410	5,370	5,580	5,580	5,560	5,730
% of Design Flow	79.33%	79.33%	78.74%	81.82%	81.82%	81.52%	84.02%
Influent BOD (mg/L)			45.0				
Primary BOD (mg/L)			45.0				
Secondary BOD (mg/L)			5.0				
% PRIMARY REMOVAL			0.0				
% SECONDARY REMOVAL			88.9				
Influent SS (mg/L)			99.0		119.0		
Primary SS (mg/L)			99.0		119.0		
Secondary SS (mg/L)			15.0		15.0		
% PRIMARY REMOVAL			0.0		0.0		
% SECONDARY REMOVAL			84.8		87.4		
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)			2.20	2.10			
Primary Total P (mg/L)							
Secondary Total P (mg/L)			1.00	0.80			
% PRIMARY REMOVAL							
% SECONDARY REMOVAL			54.5	61.9			

OPERATIONAL EVALUATION FOR: BELLE RIVER (MAIDSTONE) WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: Feb. 6, 1988
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: 6,820 m3/d

PARAMETER	SAMPLING PERIOD						
	DAY 15	DAY 16	DAY 17	DAY 18	DAY 19	DAY 20	DAY 21
RAW SEWAGE FLOW	5,940	5,900	5,870	6,050	5,790	5,800	6,240
% of Design Flow	87.10%	86.51%	86.07%	88.71%	84.90%	85.04%	91.50%
Influent BOD (mg/L)	80.0		80.0				
Primary BOD (mg/L)	80.0		80.0		80.0		
Secondary BOD (mg/L)	5.0		5.0		7.0		
% PRIMARY REMOVAL	0.0		0.0				
% SECONDARY REMOVAL	93.8		93.8				
Influent SS (mg/L)	114.0	107.0	96.0	112.0	84.0		
Primary SS (mg/L)	114.0	107.0	96.0	112.0	84.0		
Secondary SS (mg/L)	8.0	16.0	9.0	13.0	8.0		
% PRIMARY REMOVAL	0.0	0.0	0.0	0.0	0.0		
% SECONDARY REMOVAL	93.0	85.0	90.6	88.4	90.5		
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)		1.50		1.50			
Primary Total P (mg/L)							
Secondary Total P (mg/L)		0.20		0.20			
% PRIMARY REMOVAL							
% SECONDARY REMOVAL		86.7		86.7			

PLANT NAME : Belle River (Maidstone)
PLANT TYPE : Secondary

SAMPLING TYPE : Raw Sewage
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
COD	CHEMICAL OXYGEN DEMAND	mg/L	0	112.00	162.00	5	5	100.0	260	258	99.2	136.59	287.75	1.15	1.82	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0	8.80	12.10	5	5	100.0	271	271	100.0	10.28	22.39	1.13	1.81	100.0
NNHTPR	AMMONIUM,TOTAL FILT.REAC.	mg/L	0	11.00	12.20	5	5	100.0	275	274	99.6	11.87	15.37	1.04	1.69	100.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0	15.30	16.50	5	5	100.0	273	273	100.0	16.07	25.44	1.03	1.47	100.0
PH	(-LOG(H+(CONCN))		0	7.05	7.34	5	5	100.0	275	275	100.0	7.18	6.90	1.02	1.05	100.0
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/L	0	3.08	3.50	6	6	100.0	248	248	100.0	3.27	5.18	1.05	1.51	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0	26.90	62.60	5	5	100.0	267	266	99.6	44.01	126.88	1.37	1.93	100.0
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0	24.80	54.00	5	4	80.0	267	266	99.6	24.39	140.23	2.69	1.93	100.0
NNOTPR	NITRATES,TOTAL FILT.REAC.	mg/L	0	0.25	0.25	5	1	20.0	275	28	10.2	0.05	0.05	2.89	2.33	32.4
METALS																
CUUT	COPPER,UNFILT.TOTAL	ug/L	0	50.00	50.00	1	1	100.0	49	48	98.0	50.00	110.60	0.00	2.28	97.1
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	1600.00	2050.00	6	6	100.0	319	318	99.7	1740.00	370.70	1.10	2.14	100.0
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	300.00	700.00	6	5	83.3	322	306	95.0	390.00	1000.10	2.12	2.65	97.3
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	0.04	0.24	6	5	83.3	283	274	96.8	0.10	0.23	3.74	2.11	100.0
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	50.00	70.00	6	5	83.3	322	315	97.8	60.00	211.00	1.15	2.94	100.0
COUT	COBALT,UNFILT.TOTAL	ug/L	0	10.00	30.00	6	3	50.0	322	82	25.5	20.00	9.30	2.72	2.31	83.8
AGUT	SILVER,UNFILT.TOTAL	ug/L	0	10.00	10.00	6	2	33.3	321	82	25.6	10.00	10.40	1.90	2.55	75.7
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	20.00	30.00	6	2	33.3	322	237	73.6	20.00	51.10	1.98	3.44	89.2
MOUT	MOLYBDENUM,UNFILT.TOTAL	ug/L	0	50.00	50.00	6	1	16.7	321	41	12.8	10.00	12.40	1.93	1.72	56.8
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PMRBP	BUTYLBENZYLPHTHALATE	ug/L	1	15.70	18.60	5	2	40.0	275	34	12.4	8.17	5.85	1.97	1.66	37.8
PESTICIDES,HERBICIDES,PCBS																
P324D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	0.04	0.10	5	5	100.0	276	214	77.5	0.07	0.13	1.44	3.72	100.0
P1BHCG	GAMMA-BHC(HEXCHLORCYCLHEXANE)	ug/L	2	0.02	0.05	5	3	60.0	276	143	51.8	0.02	0.02	2.02	2.29	94.6
X2124	1,2,4-TRICHLOROBENZENE	ug/L	3	0.05	0.48	5	3	60.0	276	35	12.7	0.04	0.01	4.90	2.48	40.5
P1PCBT	PCB, TOTAL	ug/L	2	0.09	0.09	5	1	20.0	276	42	15.2	0.05	0.06	1.44	2.31	46.0

PLANT NAME : Belle River (Maidstone)
PLANT TYPE : Secondary

SAMPLING TYPE : Final Effluent
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	STD. FOR SURFACE WATER	STD. REF.	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET.	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																		
COD	CHEMICAL OXYGEN DEMAND	mg/L	0		-	26.00	32.00	5	5	100.0	213	211	99.1	28.33	52.80	1.08	1.83	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0		-	4.30	4.70	5	5	100.0	220	220	100.0	4.48	8.09	1.04	1.60	100.0
NNOTFR	NITRATES,TOTAL FILT.REAC.	mg/L	0		-	7.05	9.25	5	5	100.0	224	186	83.0	8.28	2.33	1.11	7.75	96.4
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0		-	0.80	1.40	5	5	100.0	222	222	100.0	0.94	7.97	1.26	2.71	100.0
PH	(-LOG(H+(CONCN))		0		-	7.23	7.32	5	5	100.0	224	224	100.0	7.29	7.10	1.00	1.05	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0		-	7.50	9.10	5	5	100.0	220	219	99.6	8.12	10.12	1.09	2.00	100.0
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/L	0		-	0.31	0.40	6	5	83.3	211	206	97.6	0.33	0.68	1.17	1.97	100.0
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0		-	6.90	11.30	5	4	80.0	213	211	99.1	4.91	21.22	4.12	2.07	100.0
NNO2PR	NITRITE,FILT. REACT.	mg/L	0		-	0.03	0.19	5	2	40.0	220	194	88.2	0.02	0.22	3.55	5.95	96.4
NNHTPR	AMMONIUM,TOTAL FILT.REAC.	mg/L	0		-	0.30	0.30	5	1	20.0	223	204	91.5	0.04	3.90	3.04	6.98	100.0
METALS																		
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	75.00	ONT-MOE	320.00	600.00	6	6	100.0	264	196	74.2	380.00	101.70	1.26	3.72	96.4
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	3750.00	ONT-MOE	1200.00	2590.00	6	6	100.0	267	267	100.0	1510.00	340.90	1.32	2.14	100.0
COUT	COBALT,UNFILT.TOTAL	ug/L	0	5.00	NYS-STD	10.00	10.00	6	5	83.3	266	65	24.4	10.00	6.40	1.45	1.54	82.1
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	0.20	ONT-MOE	0.01	0.02	6	5	83.3	233	220	94.4	0.02	0.03	4.78	2.62	100.0
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	30.00	ONT-MOE	10.00	10.00	6	5	83.3	267	262	98.1	10.00	53.30	1.45	2.48	100.0
NIUT	NICKEL,UNFILT.TOTAL	ug/L	0	25.00	ONT-MOE	20.00	20.00	6	4	66.7	267	171	64.0	20.00	22.10	2.79	3.60	85.7
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	100.00	ONT-MOE	10.00	10.00	6	3	50.0	267	137	51.3	10.00	9.00	1.81	2.00	89.3
PESTICIDES,HERBICIDES,PCBS																		
X2124	1,2,4-TRICHLOROBENZENE	ug/L	3	0.50	ONT-MOE	0.03	0.12	5	5	100.0	227	36	15.9	0.06	0.01	1.81	2.44	32.1
P324D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	4.00	ONT-MOE	0.03	0.06	5	4	80.0	227	177	78.0	0.03	0.08	1.94	4.71	100.0
P1BHCG	GAMMA-BHC(HEXCHLORCYCLHEXANE)	ug/L	2	0.06	ONT-MOE	0.02	0.02	5	3	60.0	227	157	69.2	0.01	0.02	2.14	2.48	96.4
X2HCE	HEXACHLOROETHANE	ug/L	3		-	0.01	0.02	5	2	40.0	227	5	2.2	0.01	0.01	1.86	1.23	14.3
P1PCBT	PCB, TOTAL	ug/L	2	0.00	ONT-MOE	0.11	0.11	5	1	20.0	227	9	4.0	0.03	0.02	2.14	1.40	28.6
VOLATILES ORGANIC COMPOUNDS																		
X1BDCM	BROMODICHLOROMETHANE	ug/L	1	50.00	NYS-GUL	3.60	4.90	5	3	60.0	224	7	3.1	2.76	1.55	1.76	1.20	17.9
X1CDBM	CHLORODIBROMOMETHANE	ug/L	1	50.00	NYS-GUL	2.30	2.60	5	3	60.0	224	4	1.8	1.73	1.02	1.65	1.13	7.1
X1CHLO	CHLOROFORM	ug/L	1	0.20	NYS-STD	5.50	7.50	5	3	60.0	224	37	16.5	2.98	1.37	2.73	2.18	64.3
X1ACTO	ALPHA-CHLOROTOLUENE	ug/L	1		-	3.00	3.00	5	1	20.0	224	1	0.5	1.72	1.50	1.36	1.05	3.6

PLANT NAME : Belle River (Maidstone) **SAMPLING TYPE : Raw Sludge**
PLANT TYPE : Secondary **SAMPLE FORM : Dry Weight**

CONTAM-INANT	CONTAMINANT NAME	UNITS	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
COD	CHEMICAL OXYGEN DEMAND	mg/kg	0	966379.31	966379.31	1	1	100.0	45	45	100.0	966379.31	892221.45	0.00	3.19	100.0
NKHTPR	AMMONIUM,TOTAL FILT.REAC.	mg/kg	0	4465.52	4465.52	1	1	100.0	48	47	97.9	4465.52	5911.32	0.00	4.59	100.0
NNOTPR	NITRATES,TOTAL FILT.REAC.	mg/kg	0	30.17	30.17	1	1	100.0	48	43	89.6	30.17	25.44	0.00	2.21	93.9
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/kg	0	60344.83	60344.83	1	1	100.0	51	51	100.0	60344.83	36897.85	0.00	2.98	100.0
PH	(-LOG(H+(CONCN))	mg/kg	0	6.82	6.82	1	1	100.0	49	49	100.0	6.82	6.05	0.00	1.10	100.0
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/kg	0	36637.93	36637.93	1	1	100.0	42	42	100.0	36637.93	20547.70	0.00	4.43	100.0
RST	RESIDUE, TOTAL	mg/kg	0	11600.00	11600.00	1	1	100.0	51	51	100.0	11600.00	32783.51	0.00	1.81	100.0
RSTLOI	RESIDUE,TOT.LOSS ON IGNI.	mg/kg	0	7310.00	7310.00	1	1	100.0	51	51	100.0	7310.00	20803.05	0.00	1.77	100.0
METALS																
AGUT	SILVER,UNFILT.TOTAL	mg/kg	0	6.90	6.90	1	1	100.0	45	40	88.9	6.90	30.17	0.00	2.61	84.4
ALUT	ALUMINUM,UNFILT.TOTAL	mg/kg	0	48275.86	48275.86	1	1	100.0	51	51	100.0	48275.86	9835.74	0.00	2.51	100.0
ASUT	ARSENIC,UNFILT.TOTAL	mg/kg	0	8.62	8.62	1	1	100.0	51	50	98.0	8.62	6.13	0.00	2.01	97.1
COUT	COBALT,UNFILT.TOTAL	mg/kg	0	18.10	18.10	1	1	100.0	41	30	73.2	18.10	9.29	0.00	4.09	73.3
CRUT	CHROMIUM,UNFILT.TOTAL	mg/kg	0	75.86	75.86	1	1	100.0	51	50	98.0	75.86	301.43	0.00	3.68	97.1
CUUT	COPPER,UNFILT.TOTAL	mg/kg	0	587.07	587.07	1	1	100.0	46	46	100.0	587.07	606.31	0.00	1.72	100.0
HGUT	MERCURY,UNFILT.TOTAL	mg/kg	0	1.72	1.72	1	1	100.0	50	50	100.0	1.72	2.23	0.00	1.67	100.0
SEUT	SELENIUM,UNFILT.TOTAL	mg/kg	0	6.03	6.03	1	1	100.0	50	48	96.0	6.03	3.04	0.00	1.93	93.9
SRUT	STRONTIUM,UNFILT.TOTAL	mg/kg	0	1206.90	1206.90	1	1	100.0	51	51	100.0	1206.90	231.70	0.00	1.97	100.0
ZNUT	ZINC,UNFILT.TOTAL	mg/kg	0	508.62	508.62	1	1	100.0	51	51	100.0	508.62	905.39	0.00	2.39	100.0
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PM4CRE	M-CRESOL	ug/kg	1	232.80	232.80	1	1	100.0	51	42	82.3	232.80	116847.30	0.00	12.16	85.3
PESTICIDES,HERBICIDES,PCBS																
P1CHLA	ALPHA-CHLORDANE	ug/kg	1	25.90	25.90	1	1	100.0	51	18	35.3	25.90	5.90	0.00	2.38	47.1
P1CHLG	GAMMA-CHLORDANE	ug/kg	1	34.50	34.50	1	1	100.0	51	19	37.3	34.50	6.00	0.00	2.44	50.0
P24D	2,4-DICHLOROPHENOXYACETIC ACID	ug/kg	3	206.90	206.90	1	1	100.0	51	38	74.5	206.90	93.20	0.00	6.50	82.3
VOLATILE ORGANIC COMPOUNDS																
X1CHLO	CHLOROFORM (CHCL3)	ug/kg	1	41379.30	41379.30	1	1	100.0	51	12	23.5	41379.30	1225.10	0.00	4.24	35.3

PLANT NAME : Belle River (Maidstone)
PLANT TYPE : Secondary

SAMPLING TYPE : Treated Sludge
SAMPLE FORM : Dry Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
COD	CHEMICAL OXYGEN DEMAND	mg/kg	0	822727.27	822727.27	1	1	100.0	36	36	100.0	822727.27	508097.94	0.00	4.65	100.0
NNHTFR	AMMONIUM,TOTAL FILT.REAC.	mg/kg	0	1419.58	1419.58	1	1	100.0	25	25	100.0	1419.58	17658.28	0.00	2.92	100.0
NNOTFR	NITRATES,TOTAL FILT.REAC.	mg/kg	0	12.24	12.24	1	1	100.0	26	23	88.5	12.24	42.68	0.00	2.29	95.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/kg	0	47202.80	47202.80	1	1	100.0	49	49	100.0	47202.80	38494.12	0.00	1.77	100.0
PH	(-LOG(H+(CONCN))	mg/kg	0	6.66	6.66	1	1	100.0	47	47	100.0	6.66	7.17	0.00	1.09	100.0
PHNOL	PHENOLICS (4AAP)	mg/kg	0	262.24	262.24	1	1	100.0	49	41	83.7	262.24	43.05	0.00	3.14	87.9
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/kg	0	36013.99	36013.99	1	1	100.0	43	43	100.0	36013.99	76638.67	0.00	6.91	100.0
RST	RESIDUE, TOTAL	mg/kg	0	28600.00	28600.00	1	1	100.0	50	50	100.0	28600.00	80434.04	0.00	3.23	100.0
RSTLOI	RESIDUE,TOT.LOSS ON IGNI.	mg/kg	0	17400.00	17400.00	1	1	100.0	50	50	100.0	17400.00	43379.33	0.00	3.19	100.0
METALS																
AGUT	SILVER,UNFILT.TOTAL	mg/kg	0	4.20	4.20	1	1	100.0	44	44	100.0	4.20	37.78	0.00	2.33	100.0
ALUT	ALUMINUM,UNFILT.TOTAL	mg/kg	0	41958.04	41958.04	1	1	100.0	50	50	100.0	41958.04	10715.94	0.00	2.82	100.0
ASUT	ARSENIC,UNFILT.TOTAL	mg/kg	0	9.44	9.44	1	1	100.0	50	49	98.0	9.44	5.40	0.00	2.06	97.1
CDUT	CADMIUM,UNFILT.TOTAL	mg/kg	0	2.10	2.10	1	1	100.0	45	41	91.1	2.10	10.47	0.00	3.98	90.3
COUT	COBALT,UNFILT.TOTAL	mg/kg	0	4.20	4.20	1	1	100.0	39	32	82.1	4.20	9.14	0.00	2.75	85.7
CRUT	CHROMIUM,UNFILT.TOTAL	mg/kg	0	45.45	45.45	1	1	100.0	50	50	100.0	45.45	333.06	0.00	3.59	100.0
CUUT	COPPER,UNFILT.TOTAL	mg/kg	0	598.95	598.95	1	1	100.0	45	45	100.0	598.95	732.24	0.00	2.16	100.0
HGUT	MERCURY,UNFILT.TOTAL	mg/kg	0	1.75	1.75	1	1	100.0	50	49	98.0	1.75	3.24	0.00	2.04	97.1
NIUT	NICKEL,UNFILT.TOTAL	mg/kg	0	16.08	16.08	1	1	100.0	45	42	93.3	16.08	72.95	0.00	2.95	90.0
PBUT	LEAD,UNFILT.TOTAL	mg/kg	0	59.44	59.44	1	1	100.0	50	49	98.0	59.44	196.62	0.00	2.46	97.1
SEUT	SELENIUM,UNFILT.TOTAL	mg/kg	0	5.59	5.59	1	1	100.0	50	48	96.0	5.59	2.67	0.00	2.98	97.1
SRUT	STRONTIUM,UNFILT.TOTAL	mg/kg	0	1363.64	1363.64	1	1	100.0	50	50	100.0	1363.64	240.93	0.00	2.54	100.0
ZNUT	ZINC,UNFILT.TOTAL	mg/kg	0	489.51	489.51	1	1	100.0	50	50	100.0	489.51	988.90	0.00	2.57	100.0
DIOXINS AND FURANS																
P8CDD	OCTACHLORODIBENZODIOXIN	ug/kg	1	3.50	3.50	1	1	100.0	49	26	53.1	3.50	7.10	0.00	3.84	64.7
PESTICIDES,HERBICIDES,PCBS																
P1CHLA	ALPHA-CHLORDANE	ug/kg	1	10.50	10.50	1	1	100.0	50	22	44.0	10.50	6.50	0.00	2.41	55.9
P1CHLG	GAMMA-CHLORDANE	ug/kg	1	10.50	10.50	1	1	100.0	50	21	42.0	10.50	6.80	0.00	2.58	52.9
P1PCBT	PCB, TOTAL	ug/kg	2	94.40	94.40	1	1	100.0	50	32	64.0	94.40	114.10	0.00	4.58	67.7
VOLATILES ORGANIC COMPOUNDS																
X1CHLO	CHLOROFORM (CHCL3)	ug/kg	1	12937.10	12937.10	1	1	100.0	50	12	24.0	12937.10	441.70	0.00	4.33	35.3

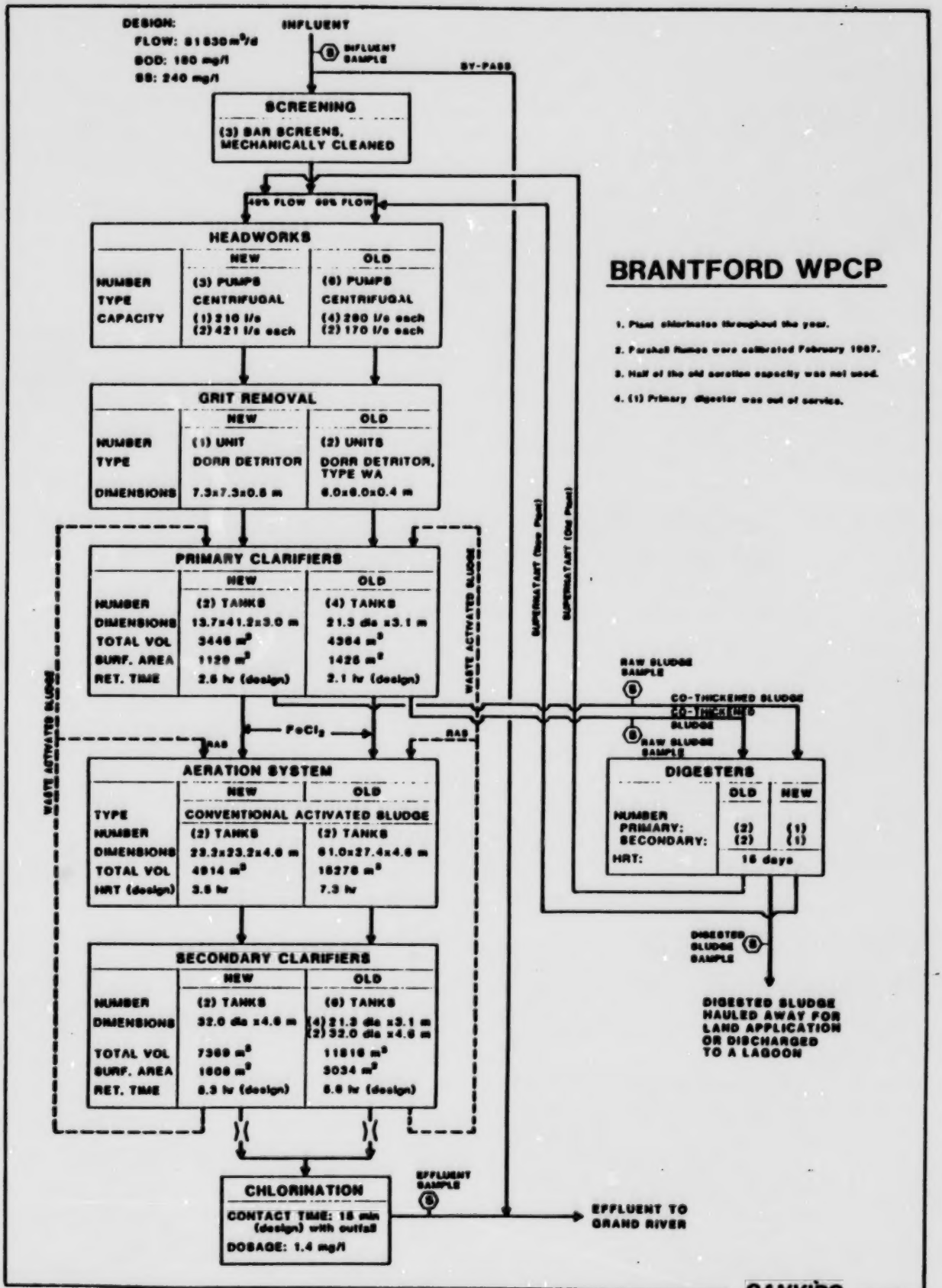
Sub-Appendix A-2

Brantford WPCP

Contents:

- Plant Schematic with Design Characteristics
- Annual Data Review (1981 - 1986 Plant Performance)
- Sources of Municipal Water Pollution Control Plant Raw Sewage
- Operational Evaluation for Brantford WPCP
- Analytical Data

(KIR18/28A)


DESIGN:
FLOW: 81830 m³/d
BOD: 180 mg/l
SS: 240 mg/l
INFLUENT
INFLUENT SAMPLE
BY-PASS
SCREENING
(3) BAR SCREENS, MECHANICALLY CLEANED
40% FLOW
60% FLOW
HEADWORKS
NEW
OLD
NUMBER
(3) PUMPS
(6) PUMPS
TYPE
CENTRIFUGAL
CENTRIFUGAL
CAPACITY
(1) 210 l/s
(2) 421 l/s each
(4) 280 l/s each
(2) 170 l/s each
GRIT REMOVAL
NEW
OLD
NUMBER
(1) UNIT
(2) UNITS
TYPE
DORR DETRITOR
DORR DETRITOR, TYPE WA
DIMENSIONS
7.3x7.3x0.8 m
6.0x6.0x0.4 m
PRIMARY CLARIFIERS
NEW
OLD
NUMBER
(2) TANKS
(4) TANKS
DIMENSIONS
13.7x41.2x3.0 m
21.3 dia x3.1 m
TOTAL VOL
3446 m³
4364 m³
SURF. AREA
1129 m²
1426 m²
RET. TIME
2.6 hr (design)
2.1 hr (design)
WASTE ACTIVATED SLUDGE
SUPERNATANT (New Plant)
SUPERNATANT (Old Plant)
RAW SLUDGE SAMPLE
CO-THICKENED SLUDGE
RAW SLUDGE SAMPLE
RAS
FeCl₃
RAS
AERATION SYSTEM
NEW
OLD
TYPE
CONVENTIONAL ACTIVATED SLUDGE
NUMBER
(2) TANKS
(2) TANKS
DIMENSIONS
23.2x23.2x4.6 m
61.0x27.4x4.6 m
TOTAL VOL
4914 m³
15278 m³
HRT (design)
3.6 hr
7.3 hr
DIGESTERS
OLD
NEW
NUMBER
PRIMARY:
(2)
(1)
SECONDARY:
(2)
(1)
HRT:
16 days
SECONDARY CLARIFIERS
NEW
OLD
NUMBER
(2) TANKS
(6) TANKS
DIMENSIONS
32.0 dia x4.6 m
(4) 21.3 dia x3.1 m
(2) 32.0 dia x4.6 m
TOTAL VOL
7369 m³
11816 m³
SURF. AREA
1608 m²
3034 m²
RET. TIME
6.3 hr (design)
5.6 hr (design)
DIGESTED SLUDGE SAMPLE
DIGESTED SLUDGE HAULED AWAY FOR LAND APPLICATION OR DISCHARGED TO A LAGOON
CHLORINATION
CONTACT TIME: 15 min (design) with outfall
DOSAGE: 1.4 mg/l
EFFLUENT SAMPLE
EFFLUENT TO GRAND RIVER
BRANTFORD WPCP
1. Plant chlorinates throughout the year.
2. Parshall flumes were calibrated February 1987.
3. Half of the old aeration capacity was not used.
4. (1) Primary digester was out of service.
CANVIRO

BRANTFORD WPCP
Conventional Activated Sludge
Phosphorus Removal - Continuous
Capacity - 81.828 10(3)m3/day

PARAMETER	1981	1982	1983	1984	1985	MEAN ANNUAL AVERAGE
Avg. Daily Flow (1000 m3/day)	43.36	49.06	49.28	54.06	58.51	50.85
BOD5 - Influent (mg/L)	169.75	174.00	160.75	136.50	168.42	161.00
BOD5 - Effluent (mg/L)	14.96	12.44	11.53	12.00	9.50	12.25
Annual BOD5 Significantly Different from Mean Annual Average BOD5?	Y	N	N	N	Y	
TSS - Influent (mg/L)	222.67	234.67	225.17	212.33	219.75	222.92
TSS - Effluent (mg/L)	7.63	7.25	5.93	7.35	8.11	7.26
Annual TSS Significantly Different from Mean Annual Average TSS?	N	N	Y	N	N	
Total P - Influent (mg/L)	6.52	6.21	6.48	5.04	5.36	5.92
Total P - Effluent (mg/L)	0.94	0.73	0.75	0.74	0.75	0.78
Annual TP Significantly Different from Mean						
Annual Average TP?	Y	N	N	N	N	
TP in Compliance?	Y	Y	Y	Y	Y	Y

I.D. - Insufficient Data

R

SOURCES OF MUNICIPAL WATER POLLUTION CONTROL PLANT RAW SEWAGE

GENERAL DESCRIPTION OF WATER POLLUTION CONTROL PLANT (WPCP)

NAME OF WPCP	BRANTFORD WPCP
WORKS NUMBER	110000043
TREATMENT TYPE	CONVENTIONAL ACTIVATED SLUDGE PHOSPHORUS REMOVAL CONTINUOUS
DESIGN CAPACITY (1000 m3/d)	81.828
1986 AVERAGE DAY FLOW (1000 m3/d)	52.517
POPULATION SERVED	73000

% OF TOTAL FLOW ATTRIBUTED TO:

INDUSTRIAL SOURCES (%)	40
COMMERCIAL SOURCES (%) (Population x 0.0757)	11
RESIDENTIAL SOURCES (%) (Population x 0.175)	24
UNACCOUNTED FOR, INCL. INFILTRATION (100-% Contributed from industrial, commercial and residential sources)	25

PROFILE OF INDUSTRIES IN CATCHMENT

TOTAL NO OF INDUSTRIES	203
INDUSTRIES WITH WATER	133
NO OF SIC CATEGORIES	45

DESCRIPTION OF THE TOP 5 INDUSTRIES DISCHARGED TO THE WPCP (BASED ON WATER USE DATA)

DESCRIPTION	SIC	# OF COMPANIES
MACHINERY MFG	3500-3599	22
MISC CONVERTED PAPER PRODUCT	2647-2655	9
TEXTILE PRODUCTS	2271-2299	5
RUBBER MFG/PROCESSING	3011-3069	4
PULP, PAPER, PAPER BOARD	2600-2631	1

OPERATIONAL EVALUATION FOR: B R A N T F O R D W P C P

TREATMENT FACILITY: Secondary
PERIOD ENDING: March 13, 1987
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: 81,830 m3/d

PARAMETER	PRE-SAMPLING PERIOD DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
RAW SEWAGE FLOW	50,750	49,250	55,550	49,550	48,800	49,400	46,786
% of Design Flow	62.02%	60.19%	67.88%	60.55%	59.64%	60.37%	57.17%
Influent BOD (mg/L)		186.0					
Primary BOD (mg/L)		161.8					
Secondary BOD (mg/L)		20.0					
% PRIMARY REMOVAL		13.0					
% SECONDARY REMOVAL		89.2					
Influent SS (mg/L)	262.0	164.0	234.0	178.0	214.0		210.0
Primary SS (mg/L)	82.4	109.6	102.0	99.2	81.2		94.8
Secondary SS (mg/L)	11.7	15.4	12.8	22.0	24.8		17.3
% PRIMARY REMOVAL	68.5	33.2	56.4	44.3	62.1		54.9
% SECONDARY REMOVAL	95.5	90.6	94.5	87.6	88.4		91.8
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)		6.24		7.64			6.94
Primary Total P (mg/L)							
Secondary Total P (mg/L)	0.92	1.68	1.46	1.98	2.28		1.66
% PRIMARY REMOVAL							
% SECONDARY REMOVAL		73.1		74.1			76.1

OPERATIONAL EVALUATION FOR: B R A N T F O R D W P C P

TREATMENT FACILITY: Secondary
PERIOD ENDING: March 13, 1987
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: 81,830 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 8	DAY 9	DAY 10	DAY 11	DAY 12	DAY 13	DAY 14
RAW SEWAGE FLOW	53,768	53,473	53,641	52,977	54,350	49,850	48,450
% of Design Flow	65.71%	65.35%	65.55%	64.74%	66.42%	60.92%	59.21%
Influent BOD (mg/L)		279.0		173.0			
Primary BOD (mg/L)		155.2		118.2			
Secondary BOD (mg/L)		19.0		22.0			
% PRIMARY REMOVAL		44.4		31.7			
% SECONDARY REMOVAL		93.2		87.3			
Influent SS (mg/L)	246.0	258.0	218.0	172.0	198.0		218.0
Primary SS (mg/L)	68.0	88.4	64.4	70.4	52.8		68.6
Secondary SS (mg/L)	13.2	13.9	15.2	10.8	9.6		12.5
% PRIMARY REMOVAL	72.4	65.7	70.5	59.1	73.3		68.5
% SECONDARY REMOVAL	94.6	94.6	93.0	93.7	95.2		94.3
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)		8.80		7.96			8.38
Primary Total P (mg/L)							
Secondary Total P (mg/L)	0.86	1.38	1.46	0.92	1.38		1.20
% PRIMARY REMOVAL							
% SECONDARY REMOVAL		84.3		88.4			85.7

OPERATIONAL EVALUATION FOR: B R A N T F O R D W P C P

TREATMENT FACILITY: Secondary
PERIOD ENDING: March 13, 1987
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: 81,830 m3/d

PARAMETER	SAMPLING PERIOD						
	DAY 15	DAY 16	DAY 17	DAY 18	DAY 19	DAY 20	DAY 21
RAW SEWAGE FLOW	53,700	54,350	53,500	50,550	56,050	50,000	43,636
% of Design Flow	65.62%	66.42%	65.38%	61.77%	68.50%	61.10%	53.33%
Influent BOD (mg/L)		179.0	199.0				189.0
Primary BOD (mg/L)		177.2	138.4				157.6
Secondary BOD (mg/L)		15.0	17.0				16.0
% PRIMARY REMOVAL		1.0	30.5				16.6
% SECONDARY REMOVAL		91.6	91.5				91.5
Influent SS (mg/L)	304.0	164.0	220.0	170.0	356.0		243.0
Primary SS (mg/L)	44.8	67.6	70.0	86.0	71.2		67.8
Secondary SS (mg/L)	7.9	20.8	13.5	6.8	8.8		11.6
% PRIMARY REMOVAL	85.3	58.8	68.2	49.4	80.0		72.1
% SECONDARY REMOVAL	97.4	87.3	93.9	96.0	97.5		95.2
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)		6.64		7.00			6.82
Primary Total P (mg/L)							
Secondary Total P (mg/L)		1.22		0.56			0.78
% PRIMARY REMOVAL							
% SECONDARY REMOVAL		81.6		92.0			88.6

OPERATIONAL EVALUATION FOR: B R A N T F O R D W P C P

TREATMENT FACILITY: Secondary
PERIOD ENDING: June 10, 1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 81,830 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
RAW SEWAGE FLOW	59,100	60,150	59,559	60,291	59,395	54,032	47,986
% of Design Flow	72.22%	73.51%	72.78%	73.68%	72.58%	66.03%	58.64%
Influent BOD (mg/L)		241.0		261.0			251.0
Primary BOD (mg/L)		159.2		150.2			154.2
Secondary BOD (mg/L)		18.0		21.0			19.5
% PRIMARY REMOVAL		33.9		42.5			38.6
% SECONDARY REMOVAL		92.5		92.0			92.2
Influent SS (mg/L)	238.0	214.0	248.0	236.0			318.0
Primary SS (mg/L)	58.4	78.8	32.4	66.0	92.4		66.0
Secondary SS (mg/L)	11.8	15.6	26.7	20.3	16.8		18.2
% PRIMARY REMOVAL	75.5	63.2	86.9	72.0			79.2
% SECONDARY REMOVAL	95.0	92.7	89.2	91.4			94.3
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)		6.08		6.24			6.16
Primary Total P (mg/L)							
Secondary Total P (mg/L)	0.76	1.00	1.82	1.22	0.92		1.14
% PRIMARY REMOVAL							
% SECONDARY REMOVAL		83.6		80.4			81.5

OPERATIONAL EVALUATION FOR: BRANTFORD WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: June 10, 1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 81,830 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 8	DAY 9	DAY 10	DAY 11	DAY 12	DAY 13	DAY 14
RAW SEWAGE FLOW	55,932	58,636	57,695	58,691	60,082	52,714	52,464
% of Design Flow	68.35%	71.66%	70.51%	71.72%	73.42%	64.42%	64.11%
Influent BOD (mg/L)				186.0			186.0
Primary BOD (mg/L)				116.8			116.8
Secondary BOD (mg/L)				4.0			4.0
% PRIMARY REMOVAL				37.2			37.2
% SECONDARY REMOVAL				97.8			97.8
Influent SS (mg/L)	366.0	242.0		172.0	350.0		282.0
Primary SS (mg/L)	54.8	60.8		67.2	54.4		59.0
Secondary SS (mg/L)	9.8	5.7		5.7	8.1		7.3
% PRIMARY REMOVAL	85.0	74.9		60.9	84.5		79.1
% SECONDARY REMOVAL	97.3	97.6		96.7	97.7		97.4
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)				7.00			7.00
Primary Total P (mg/L)							
Secondary Total P (mg/L)	0.80	0.62		0.56	1.00		0.74
% PRIMARY REMOVAL							
% SECONDARY REMOVAL				92.0			

OPERATIONAL EVALUATION FOR: BRANTFORD WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: June 10, 1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 81,830 m3/d

PARAMETER	SAMPLING PERIOD						
	DAY 15	DAY 16	DAY 17	DAY 18	DAY 19	DAY 20	DAY 21
RAW SEWAGE FLOW	57,036	57,136		60,286	54,864	51,600	51,600
% of Design Flow	69.70%	69.82%	0.00%	73.67%	67.05%	63.06%	63.06%
Influent BOD (mg/L)							
Primary BOD (mg/L)							
Secondary BOD (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent SS (mg/L)							
Primary SS (mg/L)							
Secondary SS (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)							
Primary Total P (mg/L)							
Secondary Total P (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							

PLANT NAME : Brantford
PLANT TYPE : Secondary

SAMPLING TYPE : Raw Sewage
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	PLANT MIN. CONC. > . DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0	127.00	255.00	10	10	100.0	267	266	99.6	192.21	140.23	1.23	1.93	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0	338.00	756.00	10	10	100.0	260	258	99.2	504.24	287.75	1.35	1.82	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0	39.50	62.00	10	10	100.0	271	271	100.0	50.97	22.39	1.18	1.81	100.0
NNHTPR	AMMONIUM,TOTAL FILT.REAC.	mg/L	0	8.50	13.70	10	10	100.0	275	274	99.6	11.16	15.37	1.22	1.69	100.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0	19.50	27.50	10	10	100.0	273	273	100.0	23.64	25.44	1.13	1.47	100.0
PH	(-LOG(H+(CONCN))		0	6.54	7.44	10	10	100.0	275	275	100.0	6.87	6.90	1.05	1.05	100.0
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/L	0	3.78	5.17	11	11	100.0	248	248	100.0	4.62	5.18	1.12	1.51	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0	131.00	390.00	10	10	100.0	267	266	99.6	209.06	126.88	1.47	1.93	100.0
RSPLOI	RESIDUE,PAR.LOSS ON IGNI.	mg/L	0	130.00	259.00	5	5	100.0	90	89	98.9	176.88	100.84	1.34	1.78	100.0
NNO2PR	NITRITE,FILT. REACT.	mg/L	0	0.02	0.02	10	1	10.0	271	58	21.4	0.01	0.01	1.83	2.98	51.4
METALS																
AlUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	810.00	3900.00	12	12	100.0	322	306	95.0	1230.00	1000.10	1.51	2.65	97.3
CrUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	40.00	150.00	12	12	100.0	322	237	73.6	80.00	51.10	1.49	3.44	89.2
CuUT	COPPER,UNFILT.TOTAL	ug/L	0	250.00	660.00	2	2	100.0	49	48	98.0	410.00	110.60	1.99	2.28	97.1
HgUT	MERCURY,UNFILT.TOTAL	ug/L	0	0.08	0.38	10	10	100.0	283	274	96.8	0.16	0.23	1.76	2.11	100.0
SrUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	260.00	450.00	12	12	100.0	319	318	99.7	360.00	370.70	1.22	2.14	100.0
ZnUT	ZINC,UNFILT.TOTAL	ug/L	0	300.00	600.00	12	12	100.0	322	315	97.8	380.00	211.00	1.21	2.94	100.0
CCNPUR	CYANIDE-FREE,UNFILT.REAC.	ug/L	0	10.00	20.00	10	8	80.0	271	82	30.3	10.00	1.90	2.97	6.88	32.4
NiUT	NICKEL,UNFILT.TOTAL	ug/L	0	50.00	1400.00	12	6	50.0	322	103	32.0	60.00	38.80	3.48	2.70	54.1
CoUT	COBALT,UNFILT.TOTAL	ug/L	0	10.00	60.00	12	5	41.7	322	82	25.5	10.00	9.30	2.47	2.31	83.8
CdUT	CADMIUM,UNFILT.TOTAL	ug/L	0	10.00	110.00	12	4	33.3	322	76	23.6	10.00	6.50	2.49	2.09	70.3
MoUT	MOLYBDENUM,UNFILT.TOTAL	ug/L	0	30.00	90.00	12	4	33.3	321	41	12.8	20.00	12.40	2.02	1.72	56.8
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PMMCRE	M-CRESOL	ug/L	1	15.70	105.70	10	7	70.0	275	167	60.7	21.03	25.59	2.56	3.45	86.5
PMBBP	BUTYLBENZYLPHTHALATE	ug/L	1	12.60	12.60	10	2	20.0	275	34	12.4	6.02	5.85	1.48	1.66	37.8
PMPHEN	PHENOL	ug/L	2	22.10	23.80	10	2	20.0	275	118	42.9	9.38	14.52	1.60	2.46	78.4
PNNAPH	NAPHTHALENE	ug/L	1	10.30	11.30	10	2	20.0	275	16	5.8	5.83	5.37	1.38	1.47	21.6
PNPHEN	PHENANTHRENE	ug/L	1	22.60	26.00	10	2	20.0	275	7	2.6	6.86	5.17	1.95	1.35	10.8
PMOCRE	O-CRESOL	ug/L	2	19.30	19.30	10	1	10.0	275	6	2.2	8.24	7.72	1.35	1.39	8.1
PESTICIDES,HERBICIDES,PCBS																
P24D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	0.14	2.00	10	9	90.0	276	214	77.5	0.38	0.13	3.84	3.72	100.0
P1BHCG	GAMMA-BHC(HEXCHLORCYCLHEXANE)	ug/L	2	0.02	0.07	10	8	80.0	276	143	51.8	0.03	0.02	1.89	2.29	94.6
P1DMDT	METHOXYCHLOR	ug/L	1	0.50	3.20	10	4	40.0	276	47	17.0	0.19	0.08	5.84	3.14	43.2
P1BHCB	BETA-BHC (HEXCHLORCYCLHEXANE)	ug/L	1	0.03	0.03	10	2	20.0	276	32	11.6	0.01	0.01	1.59	1.66	35.1
P1ENDS	ENDOSULFAN SULPHATE	ug/L	3	0.12	0.17	10	2	20.0	276	13	4.7	0.05	0.04	1.72	1.56	16.2
P1BHCA	ALPHA-BHC(HEXCHLORCYCLHEXANE)	ug/L	1	0.04	0.04	10	1	10.0	276	16	5.8	0.01	0.01	1.55	1.50	18.9
P1BHCD	DELTA-BHC(HEXCHLORCYCLHEXANE)	ug/L	1	0.05	0.05	10	1	10.0	276	1	0.4	0.01	0.01	1.66	1.20	2.7
P1END2	ENDOSULFAN II	ug/L	3	0.04	0.04	10	1	10.0	276	10	3.6	0.01	0.01	1.55	1.42	21.6
P1HEPT	HEPTACHLOR	ug/L	3	0.04	0.04	10	1	10.0	276	10	3.6	0.01	0.01	1.55	1.48	18.9
P1OCHL	OXYCHLORDANE	ug/L	2	0.06	0.06	10	1	10.0	276	2	0.7	0.01	0.01	1.76	1.23	5.4
P1PPDT	PP-DDT	ug/L	3	0.09	0.09	10	1	10.0	276	9	3.3	0.04	0.04	1.29	1.35	18.9
X1HCCP	HEXACHLOROCYCLOPENTADIENE	ug/L	3	0.12	0.12	10	1	10.0	276	5	1.8	0.10	0.10	1.06	1.30	13.5
X2124	1,2,4-TRICHLOROBENZENE	ug/L	3	0.11	0.11	10	1	10.0	276	35	12.7	0.01	0.01	2.13	2.48	40.5
X2HCB	HEXACHLOROBENZENE	ug/L	2	0.02	0.02	10	1	10.0	276	11	4.0	0.01	0.01	1.25	1.39	18.9
X2HCE	HEXACHLOROETHANE	ug/L	3	0.04	0.04	10	1	10.0	276	5	1.8	0.01	0.01	1.55	1.26	13.5

PLANT NAME : Brantford
PLANT TYPE : Secondary

SAMPLING TYPE : Raw Sewage
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
VOLATILES ORGANIC COMPOUNDS																
B2MPXY	M-, AND P-XYLENES	ug/L	1	52.00	220.00	10	9	90.0	274	43	15.7	85.52	26.00	2.13	2.02	37.8
B2OXYL	O-XYLENE	ug/L	1	40.00	150.00	10	8	80.0	274	25	9.1	54.61	22.47	1.98	1.56	24.3
B2EBNZ	ETHYLBENZENE	ug/L	1	42.00	150.00	10	5	50.0	274	30	11.0	41.22	23.50	2.51	1.75	29.7
X1CHLO	CHLOROFORM	ug/L	1	45.00	190.00	10	3	30.0	274	28	10.2	33.00	23.90	2.42	1.75	32.4
X1111T	1,1,1-TRICHLOROETHANE	ug/L	1	55.00	55.00	10	1	10.0	274	21	7.7	22.13	23.18	1.38	1.74	18.9
X1CTET	CARBON TETRACHLORIDE	ug/L	1	57.00	57.00	10	1	10.0	274	2	0.7	22.21	20.19	1.39	1.12	5.4
X1DCLE	1,1-DICHLOROETHENE	ug/L	1	60.00	60.00	10	1	10.0	274	7	2.6	22.32	20.55	1.42	1.28	13.5

PLANT NAME : Brantford
PLANT TYPE : Secondary

SAMPLING TYPE : Final Effluent
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	STD. FOR SURFACE WATER	STD. REF.	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET.	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV
CONVENTIONALS																		
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0		-	6.70	77.00	10	10	100.0	213	211	99.1	24.81	21.22	2.18	2.07	100.
COD	CHEMICAL OXYGEN DEMAND	mg/L	0		-	62.00	124.00	10	10	100.0	213	211	99.1	91.69	52.80	1.27	1.83	100.
DOC	DISSOLVED ORGANIC CARBON	mg/L	0		-	8.90	16.10	10	10	100.0	220	220	100.0	12.53	8.09	1.21	1.60	100.
NNHTPR	AMMONIUM,TOTAL FILT.REAC.	mg/L	0		-	5.95	12.90	10	10	100.0	223	204	91.5	8.04	3.90	1.30	6.98	100.
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0		-	7.90	14.50	10	10	100.0	222	222	100.0	10.29	7.97	1.24	2.71	100.
PH	(-LOG(H+(CONC'N))		0		-	6.88	7.54	10	10	100.0	224	224	100.0	7.17	7.10	1.03	1.05	100.
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/L	0		-	0.19	0.49	11	11	100.0	211	206	97.6	0.32	0.68	1.39	1.97	100.
RSP	RESIDUE, PARTICULATE	mg/L	0		-	4.60	13.40	10	10	100.0	220	219	99.6	7.88	10.12	1.40	2.00	100.
RSFLOI	RESIDUE,PART.LOSS ON IGNI.	mg/L	0		-	5.80	10.40	5	4	80.0	77	58	75.3	6.29	7.47	1.79	2.71	93.
NNOTPR	NITRATES,TOTAL FILT.REAC.	mg/L	0		-	0.25	1.80	10	7	70.0	224	186	83.0	0.34	2.33	4.41	7.75	96.
NNO2PR	NITRITE,FILT. REACT.	mg/L	0		-	0.03	0.12	10	6	60.0	220	194	88.2	0.02	0.22	3.48	5.95	96.
PHNOL	PHENOLICS (4AAP)	mg/L	0	0.00	ONT-MOE	0.10	0.10	10	1	10.0	225	33	14.7	0.05	0.07	1.25	1.86	53.
METALS																		
CUUT	COPPER,UNFILT.TOTAL	ug/L	0	5.00	ONT-MOE	120.00	160.00	2	2	100.0	47	30	63.8	140.00	13.10	1.23	2.56	77.
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	0.20	ONT-MOE	0.01	0.13	10	10	100.0	233	220	94.4	0.03	0.03	2.65	2.62	100
NIUT	NICKEL,UNFILT.TOTAL	ug/L	0	25.00	ONT-MOE	10.00	350.00	12	12	100.0	267	171	64.0	50.00	22.10	2.65	3.60	85.
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	3750.00	ONT-MOE	270.00	480.00	12	12	100.0	267	267	100.0	390.00	340.90	1.24	2.14	100
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	30.00	ONT-MOE	40.00	470.00	12	12	100.0	267	262	98.1	140.00	53.30	2.43	2.48	100
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	100.00	ONT-MOE	10.00	10.00	12	8	66.7	267	137	51.3	10.00	9.00	1.43	2.00	89
MOUT	MOLYBDENUM,UNFILT.TOTAL	ug/L	0		-	10.00	20.00	12	8	66.7	267	75	28.1	10.00	6.60	1.73	1.56	67
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	75.00	ONT-MOE	50.00	140.00	12	6	50.0	264	196	74.2	30.00	101.70	2.92	3.72	96
CDUT	CADMIUM,UNFILT.TOTAL	ug/L	0	0.20	ONT-MOE	0.00	10.00	12	5	41.7	267	65	24.3	0.00	2.10	2.23	2.07	71
COUT	COBALT,UNFILT.TOTAL	ug/L	0	5.00	NYS-STD	10.00	10.00	12	5	41.7	266	65	24.4	10.00	6.40	1.43	1.54	82
CCNPUR	CYANIDE-FREE,UNFILT.REAC.	ug/L	0	5.00	ONT-MOE	10.00	10.00	10	4	40.0	222	42	18.9	10.00	1.30	10.39	3.68	46
PBUT	LEAD,UNFILT.TOTAL	ug/L	0	25.00	ONT-MOE	20.00	40.00	12	2	16.7	267	25	9.4	10.00	16.50	1.50	1.48	60
PESTICIDES,HERBICIDES,PCBS																		
P24D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	4.00	ONT-MOE	0.02	2.60	10	10	100.0	227	177	78.0	0.21	0.08	3.90	4.71	10
P1BHCG	GAMMA-BHC(HEXCHLORCYCLHEXANE)	ug/L	2	0.06	ONT-MOE	0.01	0.03	10	4	40.0	227	157	69.2	0.01	0.02	1.95	2.48	96
P1DMDT	METHOXYCHLOR	ug/L	1	0.04	ONT-MOE	0.10	2.40	10	4	40.0	227	31	13.7	0.08	0.04	5.05	2.72	35
P24 5T	2,4,5-TRICLORPHENOXYACETIC ACID	ug/L	3		-	0.35	0.35	10	1	10.0	227	25	11.0	0.03	0.03	2.30	2.27	42
P5ILV	SILVEX	ug/L	3		-	0.61	0.61	10	1	10.0	227	23	10.1	0.03	0.03	2.75	1.83	5
VOLATILES ORGANIC COMPOUNDS																		
X1CHLO	CHLOROFORM	ug/L	1	0.20	NYS-STD	2.50	31.00	10	4	40.0	224	37	16.5	2.28	1.37	3.73	2.18	6
X1111T	1,1,1-TRICHLOROETHANE	ug/L	1	50.00	NYS-GUL	3.90	18.00	10	2	20.0	224	18	8.0	1.53	1.18	2.63	1.86	2

PLANT NAME : Brantford
PLANT TYPE : Secondary

SAMPLING TYPE : Raw Sludge
SAMPLE FORM : Dry Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
COD	CHEMICAL OXYGEN DEMAND	mg/kg	0	1180555.56	1826530.61	2	2	100.0	45	45	100.0	1468441.64	892221.45	1.36	3.19	100.0
NNITPR	AMMONIUM,TOTAL FILT.REAC.	mg/kg	0	3217.59	8826.53	2	2	100.0	48	47	97.9	5329.18	5911.32	2.04	4.59	100.0
NNOTPR	NITRATES,TOTAL FILT.REAC.	mg/kg	0	40.82	42.82	2	2	100.0	48	43	89.6	41.81	25.44	1.05	2.21	93.9
NNTKUR	NITROGEN-TOT KJEL,UNF.TOT	mg/kg	0	35416.67	47193.88	2	2	100.0	51	51	100.0	40883.37	36897.85	1.23	2.98	100.0
PH	(-LOG10+(CONCN))	mg/kg	0	5.25	5.67	2	2	100.0	49	49	100.0	5.46	6.03	1.06	1.10	100.0
PPUT	PHOSPHORUS,UNFILT.TOTAL.	mg/kg	0	15277.78	20153.06	2	2	100.0	42	42	100.0	17546.91	20347.70	1.22	4.43	100.0
RST	RESIDUE, TOTAL	mg/kg	0	39200.00	43200.00	2	2	100.0	51	51	100.0	41151.43	32783.51	1.07	1.81	100.0
RSTL01	RESIDUE,TOT.LOSS ON IGNI	mg/kg	0	28000.00	29700.00	2	2	100.0	51	51	100.0	28837.48	20803.05	1.04	1.77	100.0
METALS																
AGUT	SILVER,UNFILT.TOTAL.	mg/kg	0	21.53	21.53	1	1	100.0	45	40	88.9	21.53	30.17	0.00	2.61	84.4
ALUT	ALUMINUM,UNFILT.TOTAL.	mg/kg	0	4629.63	4993.37	2	2	100.0	51	51	100.0	4808.06	9835.74	1.05	2.51	100.0
ASUT	ARSENIC,UNFILT.TOTAL.	mg/kg	0	4.40	5.61	2	2	100.0	51	50	98.0	4.97	6.13	1.19	2.01	97.1
CDUT	CADMIUM,UNFILT.TOTAL.	mg/kg	0	8.33	10.71	2	2	100.0	43	40	93.0	9.45	9.74	1.19	4.35	90.0
COUT	COBALT,UNFILT.TOTAL.	mg/kg	0	12.27	17.35	2	2	100.0	41	30	73.2	14.59	9.29	1.28	4.69	73.3
CRUT	CHROMIUM,UNFILT.TOTAL.	mg/kg	0	439.81	482.14	2	2	100.0	51	50	98.0	460.49	301.43	1.07	3.68	97.1
CUUT	COPPER,UNFILT.TOTAL.	mg/kg	0	763.89	1348.98	2	2	100.0	46	46	100.0	1015.12	606.31	1.50	1.72	100.0
HGUT	MERCURY,UNFILT.TOTAL.	mg/kg	0	1.62	1.79	2	2	100.0	50	50	100.0	1.70	2.23	1.07	1.67	100.0
MOUT	MOLYBDENUM,UNFILT.TOTAL.	mg/kg	0	6.25	6.25	1	1	100.0	37	23	62.2	6.25	5.80	0.00	2.88	64.3
NIUT	NICKEL,UNFILT.TOTAL.	mg/kg	0	83.33	111.73	2	2	100.0	46	44	95.7	96.49	59.17	1.23	2.90	93.3
PBUT	LEAD,UNFILT.TOTAL.	mg/kg	0	187.50	239.80	2	2	100.0	49	48	98.0	212.04	173.99	1.19	2.24	96.9
SEUT	SELENIUM,UNFILT.TOTAL.	mg/kg	0	0.93	2.04	2	2	100.0	50	48	96.0	1.37	3.04	1.75	1.93	93.9
SRUT	STRONTIUM,UNFILT.TOTAL.	mg/kg	0	168.98	219.13	2	2	100.0	51	51	100.0	192.43	231.70	1.20	1.97	100.0
ZNUT	ZINC,UNFILT.TOTAL.	mg/kg	0	949.07	1470.41	2	2	100.0	51	51	100.0	1181.32	905.39	1.36	2.39	100.0
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PMMCRE	M-CRESOL	ug/kg	1	120370.40	630102.00	2	2	100.0	51	42	82.3	275400.90	116847.30	3.22	12.16	85.3
PNANTH	ANTHRACENE	ug/kg	1	5484.70	5484.70	2	1	50.0	51	1	2.0	3563.10	2919.80	1.84	1.80	2.9
PNNAPH	NAPHTHALENE	ug/kg	1	6530.60	6530.60	2	1	50.0	51	6	11.8	3888.10	3823.30	2.08	3.75	14.7
PNPHEN	PHENANTHRENE	ug/kg	1	20648.10	20648.10	2	1	50.0	51	6	11.8	7257.60	3563.50	4.39	2.19	17.7
DIOXINS AND FURANS																
P97CDD	HEPTACHLORODIBENZODIOXIN	ug/kg	1	1.90	1.90	2	1	50.0	50	6	12.0	4.90	7.20	3.85	4.12	17.7
P98CDD	OCTACHLORODIBENZODIOXIN	ug/kg	1	3.50	3.50	2	1	50.0	50	25	50.0	9.40	8.50	4.07	3.60	58.8
PESTICIDES,HERBICIDES,PCBS																
P1BHCB	BETA-BHC (HEXACHLORCYCLHEX	ug/kg	1	4.60	79.10	2	2	100.0	51	18	35.3	19.10	7.40	7.47	3.29	38.2
P1BHCG	GAMMA-BHC(HEXACHLORCYCLHEX	ug/kg	2	11.60	20.40	2	2	100.0	51	28	54.9	15.40	8.90	1.49	2.69	67.7
P1CHLA	ALPHA-CHLORDANE	ug/kg	1	4.60	17.90	2	2	100.0	51	18	35.3	9.10	5.90	2.61	2.38	47.1
P1CHLG	GAMMA-CHLORDANE	ug/kg	1	4.60	12.80	2	2	100.0	51	19	37.3	7.70	6.00	2.06	2.44	50.0
P1OCHL	OXYCHLORDANE	ug/kg	2	4.60	21.70	2	2	100.0	51	8	15.7	10.00	4.50	2.99	2.27	20.6
P1PCBT	PCB, TOTAL	ug/kg	2	83.30	119.90	2	2	100.0	51	40	78.4	99.90	88.70	1.29	3.18	79.4
X2HCB	HEXACHLOROBENZENE	ug/kg	2	1.00	6.90	2	2	100.0	51	17	33.3	2.60	5.60	3.92	2.65	38.2
P1ALDR	ALDRIN	ug/kg	1	30.60	30.60	2	1	50.0	51	6	11.8	8.40	4.60	6.23	2.50	17.7

PLANT NAME : Brantford
PLANT TYPE : Secondary

SAMPLING TYPE : Raw Sludge
SAMPLE FORM : Dry Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
P1BHCD	DELTA-BHC(HEXACHLORCYCLOHEX	ug/kg	1	25.00	25.00	2	1	50.0	51	3	5.9	7.30	4.00	5.09	2.22	8.8
P1DIEL	DIELDRIN	ug/kg	2	74.00	74.00	2	1	50.0	51	20	39.2	13.00	7.20	11.64	3.10	50.0
P1DMDT	METHOXYCHLOR	ug/kg	1	2091.80	2091.80	2	1	50.0	51	19	37.3	155.80	45.80	39.38	5.15	44.1
P1END1	ENDOSULFAN I	ug/kg	3	15.30	15.30	2	1	50.0	51	9	17.7	5.90	4.60	3.82	2.56	20.6
P1HEPT	HEPTACHLOR	ug/kg	3	1.00	1.00	2	1	50.0	51	7	13.7	1.50	4.50	1.80	2.83	20.6
P1PPDD	PP-DDD	ug/kg	1	7.70	7.70	2	1	50.0	51	13	25.5	4.20	5.10	2.35	2.48	35.3
P1PPDE	PP-DDE	ug/kg	1	19.10	19.10	2	1	50.0	51	22	43.1	6.60	7.30	4.47	2.31	52.9
P1PPDT	PP-DDT	ug/kg	3	20.40	20.40	2	1	50.0	51	6	11.8	13.80	16.40	1.74	2.27	17.7
	VOLATILES ORGANIC COMPOUNDS															
B2FBNZ	ETHYLBENZENE (C8H10)	ug/kg	1	1173.50	1173.50	2	1	50.0	51	10	19.6	737.10	890.70	1.93	2.60	36.5
B2MPXY	M-, AND P-XYLENES	ug/kg	1	4081.60	4081.60	2	1	50.0	51	16	31.4	1374.70	1345.90	4.66	3.86	41.2
B2OXYL	O-XYLENE (C8H10)	ug/kg	1	1096.90	1096.90	2	1	50.0	51	8	15.7	712.60	841.60	1.84	2.51	23.5

PLANT NAME : Brantford
PLANT TYPE : Secondary

SAMPLING TYPE : Treated Sludge
SAMPLE FORM : Dry Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
COD	CHEMICAL OXYGEN DEMAND	mg/kg	0	967058.82	1427728.61	2	2	100.0	36	36	100.0	1175030.87	508097.94	1.32	4.65	100.0
NNHTFR	AMMONIUM,TOTAL FIL.T.REAC.	mg/kg	0	17552.94	23569.32	2	2	100.0	25	25	100.0	20339.88	17658.28	1.23	2.92	100.0
NNOTFR	NITRATES,TOTAL FIL.T.REAC.	mg/kg	0	32.94	59.00	2	2	100.0	26	23	88.5	44.08	42.68	1.51	2.29	95.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/kg	0	50117.65	57522.12	2	2	100.0	49	49	100.0	53692.40	38494.12	1.10	1.77	100.0
PH	(-LOG(H+(CONCN))	mg/kg	0	7.48	7.68	2	2	100.0	47	47	100.0	7.58	7.17	1.02	1.09	100.0
PPUT	PHOSPHORUS,UNFIL.T.TOTAL.	mg/kg	0	25176.47	29793.51	2	2	100.0	43	43	100.0	27387.87	76638.67	1.13	6.91	100.0
RST	RESIDUE, TOTAL	mg/kg	0	33900.00	42500.00	2	2	100.0	50	50	100.0	37957.21	80434.06	1.17	3.23	100.0
RSTLOI	RESIDUE,TOT LOSS ON IGNI.	mg/kg	0	20900.00	24800.00	2	2	100.0	50	50	100.0	22766.64	43379.33	1.13	3.19	100.0
PHNOL	PHENOLICS (4AAP)	mg/kg	0	96.47	96.47	2	1	50.0	49	41	83.7	37.72	43.05	3.77	3.14	87.9
METALS																
AGUT	SILVER,UNFIL.T.TOTAL.	mg/kg	0	35.29	51.62	2	2	100.0	44	44	100.0	42.68	37.78	1.31	2.33	100.0
ALUT	ALUMINUM,UNFIL.T.TOTAL.	mg/kg	0	6712.09	6823.53	2	2	100.0	50	50	100.0	6767.58	10715.94	1.01	2.82	100.0
ASUT	ARSENIC,UNFIL.T.TOTAL.	mg/kg	0	9.73	10.59	2	2	100.0	50	49	98.0	10.15	5.40	1.06	2.06	97.1
CDUT	CADMIUM,UNFIL.T.TOTAL.	mg/kg	0	18.58	19.06	2	2	100.0	45	41	91.1	18.82	10.47	1.02	3.98	90.3
COUT	COBALT,UNFIL.T.TOTAL.	mg/kg	0	12.24	38.35	2	2	100.0	39	32	82.1	21.66	9.14	2.24	2.75	85.7
CRUT	CHROMIUM,UNFIL.T.TOTAL.	mg/kg	0	800.00	849.85	2	2	100.0	50	50	100.0	824.55	333.06	1.04	3.59	100.0
CUUT	COPPER,UNFIL.T.TOTAL.	mg/kg	0	1351.03	1505.88	2	2	100.0	45	45	100.0	1426.36	732.24	1.08	2.16	100.0
HGUT	MERCURY,UNFIL.T.TOTAL.	mg/kg	0	1.77	3.06	2	2	100.0	50	49	98.0	2.33	3.24	1.47	2.04	97.1
MOUT	MOLYBDENUM,UNFIL.T.TOTAL.	mg/kg	0	7.76	17.11	2	2	100.0	34	23	67.7	11.53	6.41	1.75	2.84	69.2
NIUT	NICKEL,UNFIL.T.TOTAL.	mg/kg	0	142.18	164.71	2	2	100.0	45	42	93.3	153.03	72.95	1.11	2.95	90.0
PBUT	LEAD,UNFIL.T.TOTAL.	mg/kg	0	469.32	470.59	2	2	100.0	50	49	98.0	469.95	196.62	1.00	2.46	97.1
SEUT	SELENIUM,UNFIL.T.TOTAL.	mg/kg	0	2.59	2.95	2	2	100.0	50	48	96.0	2.76	2.67	1.10	2.98	97.1
SRUT	STRONTIUM,UNFIL.T.TOTAL.	mg/kg	0	258.82	270.80	2	2	100.0	50	50	100.0	264.74	240.93	1.03	2.54	100.0
ZNUT	ZINC,UNFIL.T.TOTAL.	mg/kg	0	1976.47	2344.54	2	2	100.0	50	50	100.0	2152.65	988.90	1.13	2.57	100.0
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PNPHEN	PHENANTHRENE	ug/kg	1	18705.00	28235.30	2	2	100.0	50	12	24.0	22981.30	2220.50	1.34	4.27	26.5
PNMCRE	M-CRESOL	ug/kg	1	106194.70	106194.70	2	1	50.0	50	15	30.0	19359.80	5281.80	11.10	8.20	35.3
PNNITB	NITROBENZENE	ug/kg	1	6398.20	6398.20	2	1	50.0	50	3	6.0	3880.00	1405.80	2.03	3.46	8.8
PNNAPH	NAPHTHALENE	ug/kg	1	10569.30	10569.30	2	1	50.0	50	6	12.0	4986.80	1545.60	2.89	3.77	14.7
DIOXINS AND FURANS																
P87CDD	HEPTACHLORODIBENZODIOXIN	ug/kg	1	1.80	1.80	2	1	50.0	49	10	20.4	8.90	5.00	9.62	3.21	23.5
P8CDD	OCTACHLORODIBENZODIOXIN	ug/kg	1	35.40	35.40	2	1	50.0	49	26	53.1	11.10	7.10	5.14	3.84	64.7
PESTICIDES,HERBICIDES,PCBS																
PUPCBT	PCB, TOTAL	ug/kg	2	82.60	101.20	2	2	100.0	50	32	64.0	91.40	114.10	1.15	4.58	67.7
P24D	2,4-DICHLOROPHENOXYACETIC	ug/kg	3	91.80	1710.90	2	2	100.0	50	25	50.0	396.30	75.00	7.91	5.81	64.7
P245T	2,4,5-TRICHLOROPHENOXYACETIC	ug/kg	3	767.00	767.00	2	1	50.0	50	16	32.0	95.10	84.40	19.14	3.13	41.2
P5SILV	SILVEX	ug/kg	3	354.00	354.00	2	1	50.0	50	18	36.0	64.60	92.70	11.08	2.94	44.1
X24CB	HEXACHLOROBENZENE	ug/kg	2	9.40	9.40	2	1	50.0	50	21	42.0	5.20	7.00	2.30	2.96	55.9

PLANT NAME : Brantford
PLANT TYPE : Secondary

SAMPLING TYPE : Treated Sludge
SAMPLE FORM : Dry Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
VOLATILES ORGANIC COMPOUNDS																
B2PBNZ	ETHYLBENZENE (C8H10)	ug/kg	1	1445.40	1445.40	2	1	50.0	50	14	28.0	824.70	606.50	2.21	5.59	32.4
B2MPXY	M-, AND P-XYLENES	ug/kg	1	5309.70	5309.70	2	1	50.0	50	15	30.0	1580.70	816.00	5.55	7.11	32.4
B2OXYL	O-XYLENE (C8H10)	ug/kg	1	1592.90	1592.90	2	1	50.0	50	14	28.0	865.80	523.50	2.37	4.05	32.4

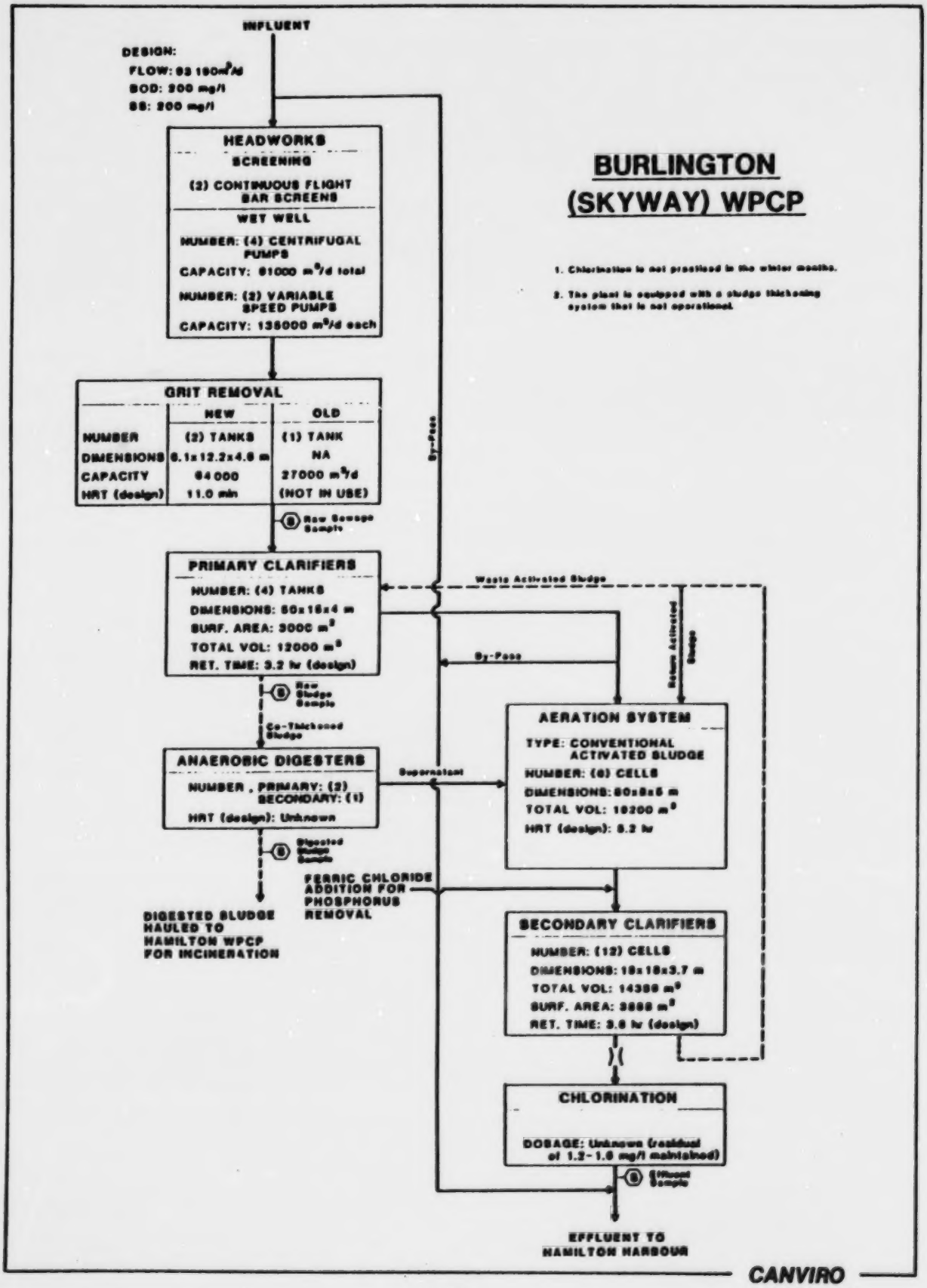
Sub-Appendix A-3

Burlington (Skyway) WPCP

Contents:

- Plant Schematic with Design Characteristics
- Annual Data Review (1981 - 1986 Plant Performance)
- Sources of Municipal Water Pollution Control Plant Raw Sewage
- Operational Evaluation for Burlington (Skyway) WPCP
- Analytical Data

(KIR18/28A)


INFLUENT
DESIGN:
FLOW: 68 180 m³/d
BOD: 200 mg/l
SS: 200 mg/l
HEADWORKS
SCREENING
(2) CONTINUOUS FLIGHT BAR SCREENS
WET WELL
NUMBER: (4) CENTRIFUGAL PUMPS
CAPACITY: 81000 m³/d total
NUMBER: (2) VARIABLE SPEED PUMPS
CAPACITY: 136000 m³/d each
GRIT REMOVAL
NEW
OLD
NUMBER
(2) TANKS
(1) TANK
DIMENSIONS
6.1x12.2x4.6 m
NA
CAPACITY
84 000
27000 m³/d
HRT (design)
11.0 min
(NOT IN USE)
By-Pass
Raw Sewage Sample
PRIMARY CLARIFIERS
NUMBER: (4) TANKS
DIMENSIONS: 50x16x4 m
SURF. AREA: 3000 m²
TOTAL VOL: 12000 m³
RET. TIME: 3.2 hr (design)
Waste Activated Sludge
Return Activated Sludge
By-Pass
Raw Sludge Sample
Co-Thickened Sludge
ANAEROBIC DIGESTERS
NUMBER, PRIMARY: (2) SECONDARY: (1)
HRT (design): Unknown
Supernatant
AERATION SYSTEM
TYPE: CONVENTIONAL ACTIVATED SLUDGE
NUMBER: (6) CELLS
DIMENSIONS: 50x8x5 m
TOTAL VOL: 19200 m³
HRT (design): 8.2 hr
Digested Sludge Sample
FERRIC CHLORIDE ADDITION FOR PHOSPHORUS REMOVAL
DIGESTED SLUDGE HAULED TO HAMILTON WPCP FOR INCINERATION
SECONDARY CLARIFIERS
NUMBER: (12) CELLS
DIMENSIONS: 18x18x3.7 m
TOTAL VOL: 14388 m³
SURF. AREA: 3888 m²
RET. TIME: 3.8 hr (design)
CHLORINATION
DOSAGE: Unknown (residual of 1.2-1.8 mg/l maintained)
Effluent Sample
EFFLUENT TO HAMILTON HARBOUR
BURLINGTON (SKYWAY) WPCP
1. Chlorination is not practised in the winter months.
2. The plant is equipped with a sludge thickening system that is not operational.
CANVIRO

SKYWAY WPCP
Conventional Activated Sludge
Phosphorus Removal - Continuous
Capacity - 93.193 10(3)m3/day

PARAMETER	1981	1982	1983	1984	1985	MEAN ANNUAL AVERAGE
Avg. Daily Flow (1000 m3/day)	73.10	77.01	86.60	87.66	67.00	78.27
BOD5 - Influent (mg/L)	218.10	157.20	181.00	170.83	159.67	177.36
BOD5 - Effluent (mg/L)	7.20	8.00	7.70	9.13	9.20	8.26
Annual BOD5 Significantly Different from Mean Annual Average BOD5?	I.D.	I.D.	I.D.	I.D.	I.D.	
TSS - Influent (mg/L)	215.80	138.60	219.00	220.92	185.58	195.98
TSS - Effluent (mg/L)	10.10	8.40	6.37	7.05	7.46	7.88
Annual TSS Significantly Different from Mean Annual Average TSS?	I.D.	I.D.	I.D.	I.D.	I.D.	
Total P - Influent (mg/L)	8.30	6.26	6.90	7.76	6.50	7.14
Total P - Effluent (mg/L)	1.09	0.93	0.54	0.72	0.74	0.80
Annual TP Significantly Different from Mean Annual Average TP?	I.D.	I.D.	I.D.	I.D.	I.D.	
TP in Compliance?	N	Y	Y	Y	Y	Y

I.D. - Insufficient Data

R

SOURCES OF MUNICIPAL WATER POLLUTION CONTROL PLANT RAW SEWAGE

GENERAL DESCRIPTION OF WATER POLLUTION CONTROL PLANT (WPCP)

NAME OF WPCP	SKYWAY WPCP
WORKS NUMBER	110000070
TREATMENT TYPE	CONVENTIONAL ACTIVATED SLUDGE PHOSPHORUS REMOVAL CONTINUOUS
DESIGN CAPACITY (1000 m3/d)	93.193
1986 AVERAGE DAY FLOW (1000 m3/d)	70.631
POPULATION SERVED	120100

% OF TOTAL FLOW ATTRIBUTED TO:

INDUSTRIAL SOURCES (%)	17
COMMERCIAL SOURCES (%) (Population x 0.0757)	13
RESIDENTIAL SOURCES (%) (Population x 0.175)	30
UNACCOUNTED FOR, INCL. INFILTRATION (100-% Contributed from industrial, commercial and residential sources)	40

PROFILE OF INDUSTRIES IN CATCHMENT

TOTAL NO OF INDUSTRIES	335
INDUSTRIES WITH WATER	248
NO OF SIC CATEGORIES	44

DESCRIPTION OF THE TOP 5 INDUSTRIES DISCHARGED TO THE WPCP (BASED ON WATER USE DATA)

DESCRIPTION	SIC	# OF COMPANIES
MEAT	2011-2013	4
CHEMICALS/CHEMICAL PREPARATION	2899-2899	4
MISC. METALS FABRICATED PRODUCTS	3490-3499	11
ELECTRICAL AND ELECTRONIC COMP	3612-3690	17
STONE,CLAY AND MINERAL PRODUCTS	3200-3299	15

R

OPERATIONAL EVALUATION FOR: BURLINGTON SKYWAY WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: January 23, 1987
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: 93,190 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
RAW SEWAGE FLOW	72,444	71,948	73,538	71,384	71,946	71,007	70,682
% of Design Flow	77.74%	77.21%	78.91%	76.60%	77.20%	76.20%	75.85%
Influent BOD (mg/L)			126.0				
Primary BOD (mg/L)			80.0				
Secondary BOD (mg/L)			36.0				
% PRIMARY REMOVAL			36.5				
% SECONDARY REMOVAL			71.4				
Influent SS (mg/L)			173.0				
Primary SS (mg/L)			108.0				
Secondary SS (mg/L)			46.0				
% PRIMARY REMOVAL			37.6				
% SECONDARY REMOVAL			73.4				
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)			4.00				
Primary Total P (mg/L)							
Secondary Total P (mg/L)			1.70				
% PRIMARY REMOVAL							
% SECONDARY REMOVAL			57.5				

OPERATIONAL EVALUATION FOR: BURLINGTON SKYWAY WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: January 23, 1987
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: 93,190 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 8	DAY 9	DAY 10	DAY 11	DAY 12	DAY 13	DAY 14
RAW SEWAGE FLOW	73,372	76,792	81,729	84,960	79,049	72,509	74,287
% of Design Flow	78.73%	82.40%	87.70%	91.17%	84.83%	77.81%	79.72%
Influent BOD (mg/L)			82.0				
Primary BOD (mg/L)			53.0				
Secondary BOD (mg/L)			13.0				
% PRIMARY REMOVAL			35.4				
% SECONDARY REMOVAL			84.1				
Influent SS (mg/L)			188.0				
Primary SS (mg/L)			62.0				
Secondary SS (mg/L)			35.0				
% PRIMARY REMOVAL			67.0				
% SECONDARY REMOVAL			81.4				
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)			3.20				
Primary Total P (mg/L)			0.13				
Secondary Total P (mg/L)							
% PRIMARY REMOVAL			95.9				
% SECONDARY REMOVAL							

OPERATIONAL EVALUATION FOR: B U R L I N G T O N S K Y W A Y W P C P

TREATMENT FACILITY: Secondary
PERIOD ENDING: January 23, 1987
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: 93,190 m3/d

PARAMETER	SAMPLING PERIOD						
	DAY 15	DAY 16	DAY 17	DAY 18	DAY 19	DAY 20	DAY 21
RAW SEWAGE FLOW	74,523	68,795	69,857	71,258	69,846	68,712	64,558
% of Design Flow	79.97%	73.82%	74.96%	76.47%	74.95%	73.73%	69.28%
Influent BOD (mg/L)		148.0					
Primary BOD (mg/L)		103.0					
Secondary BOD (mg/L)		16.0					
% PRIMARY REMOVAL		30.4					
% SECONDARY REMOVAL		89.2					
Influent SS (mg/L)		175.0					
Primary SS (mg/L)		78.0					
Secondary SS (mg/L)		11.0					
% PRIMARY REMOVAL		55.4					
% SECONDARY REMOVAL		93.7					
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)		3.80					
Primary Total P (mg/L)							
Secondary Total P (mg/L)		0.93					
% PRIMARY REMOVAL							
% SECONDARY REMOVAL		75.5					

OPERATIONAL EVALUATION FOR: BURLINGTON (SKYWAY) WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: June 26, 1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 93,190 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
RAW SEWAGE FLOW	66,896	59,001	59,996	61,226	63,898	55,968	57,703
% of Design Flow	71.78%	63.31%	64.38%	65.70%	68.57%	60.06%	61.92%
Influent BOD (mg/L)	158.0		143.0	184.0			
Primary BOD (mg/L)	103.0		95.0	162.0			
Secondary BOD (mg/L)	2.0		5.5	4.7			
% PRIMARY REMOVAL	34.8		33.6	12.0			
% SECONDARY REMOVAL	98.7		96.2	97.4			
Influent SS (mg/L)			190.0				
Primary SS (mg/L)			88.0				
Secondary SS (mg/L)			7.6				
% PRIMARY REMOVAL			53.7				
% SECONDARY REMOVAL			96.0				
Influent NH4 (mg/L)	16.8		12.3	14.0			
Primary NH4 (mg/L)	19.0		14.6	17.4			
Secondary NH4 (mg/L)	28.5		23.5	15.4			
% PRIMARY REMOVAL	-13.1		-18.7	-24.3			
% SECONDARY REMOVAL	-69.6		-91.1	-10.0			
Influent TKN (mg/L)	25.5		13.0	13.0			
Primary TKN (mg/L)	29.4		12.0	21.0			
Secondary TKN (mg/L)	28.5		10.0	18.4			
% PRIMARY REMOVAL	-15.3		7.7	-61.5			
% SECONDARY REMOVAL	-11.8		23.1	-41.5			
Influent Total P (mg/L)	2.06		6.48	3.62			
Primary Total P (mg/L)	2.62		3.62	4.55			
Secondary Total P (mg/L)	0.73		0.47	0.85			
% PRIMARY REMOVAL	-27.2		44.1	-25.7			
% SECONDARY REMOVAL	64.6		92.7	76.5			

OPERATIONAL EVALUATION FOR: BURLINGTON (SKYWAY) WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: June 26, 1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 93,190 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 8	DAY 9	DAY 10	DAY 11	DAY 12	DAY 13	DAY 14
RAW SEWAGE FLOW	66,177	61,420	60,857	58,737	62,713	58,088	64,370
% of Design Flow	71.01%	65.91%	65.30%	63.03%	67.30%	62.33%	69.07%
Influent BOD (mg/L)	124.0	137.0	146.7	196.8			
Primary BOD (mg/L)	96.0	78.0	95.6	66.2			
Secondary BOD (mg/L)	6.0	6.3	2.6	11.1			
% PRIMARY REMOVAL	22.6	43.1	34.8	66.4			
% SECONDARY REMOVAL	95.2	95.4	98.3	94.4			
Influent SS (mg/L)	178.0	150.0	150.0	208.0			
Primary SS (mg/L)	142.0	116.0	220.0	336.0			
Secondary SS (mg/L)		10.4					
% PRIMARY REMOVAL		22.7					
% SECONDARY REMOVAL	100.0	93.1	100.0	100.0			
Influent NH4 (mg/L)	15.2	15.7	15.1	15.1			
Primary NH4 (mg/L)	20.7	20.7	17.9	19.6			
Secondary NH4 (mg/L)		19.9	21.3	21.3			
% PRIMARY REMOVAL		-31.8	-18.5	-29.8			
% SECONDARY REMOVAL	100.0	-26.8	-41.1	-41.1			
Influent TKN (mg/L)	15.6	11.6	18.0	18.5			
Primary TKN (mg/L)	20.7	23.5	19.0	19.2			
Secondary TKN (mg/L)	26.7	17.2	21.2	21.1			
% PRIMARY REMOVAL	-32.7	-102.6	-5.6	-3.8			
% SECONDARY REMOVAL	-71.2	-48.3	-17.8	-14.1			
Influent Total P (mg/L)	7.00	7.60	3.22	6.60			
Primary Total P (mg/L)	4.78	4.70	4.44	4.81			
Secondary Total P (mg/L)	1.19	1.90	0.90	0.79			
% PRIMARY REMOVAL	31.7	38.2	-37.9	27.1			
% SECONDARY REMOVAL	83.0	75.0	72.0	88.0			

OPERATIONAL EVALUATION FOR: BURLINGTON (SKYWAY) WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: June 26, 1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 93,190 m3/d

PARAMETER	SAMPLING PERIOD DAY 15	DAY 16	DAY 17	DAY 18	DAY 19	DAY 20	DAY 21
RAW SEWAGE FLOW	97,490	74,633	67,492	71,084	69,085		
% of Design Flow	104.61%	80.09%	72.42%	76.28%	74.13%		
Influent BOD (mg/L)	367.8	168.6	162.5	340.8			
Primary BOD (mg/L)	100.2	181.4	77.1	93.2			
Secondary BOD (mg/L)	7.4		12.6	14.6			
% PRIMARY REMOVAL	72.8	-7.6	52.6	72.7			
% SECONDARY REMOVAL	98.0		92.2	95.7			
Influent SS (mg/L)	186.0	196.0	35.2	218.0			
Primary SS (mg/L)	144.0	120.0	15.2	102.0			
Secondary SS (mg/L)	20.4	5.2	22.1	21.8			
% PRIMARY REMOVAL	22.6	38.8	56.8	53.2			
% SECONDARY REMOVAL	89.0	97.3	37.2	90.0			
Influent NH4 (mg/L)	13.4		14.0	13.4			
Primary NH4 (mg/L)	17.4		20.7	19.6			
Secondary NH4 (mg/L)	16.0		20.4	19.6			
% PRIMARY REMOVAL	-29.9		-47.9	-46.3			
% SECONDARY REMOVAL	-19.1		-45.7	-46.3			
Influent TKN (mg/L)	18.9		34.0	16.4			
Primary TKN (mg/L)	12.0		28.0	18.3			
Secondary TKN (mg/L)	9.5		23.0	15.6			
% PRIMARY REMOVAL	36.6		17.6	-11.6			
% SECONDARY REMOVAL	49.8		32.4	4.9			
Influent Total P (mg/L)	3.80	8.40	6.60	3.42			
Primary Total P (mg/L)	3.71	99.60	4.81	4.64			
Secondary Total P (mg/L)	0.46	1.00	0.99	2.60			
% PRIMARY REMOVAL	2.4	-1085.7	27.1	-35.7			
% SECONDARY REMOVAL	87.9	88.1	85.0	24.0			

PLANT NAME : Burlington (Skyway)
PLANT TYPE : Secondary

SAMPLING TYPE : Raw Sewage
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0	66.40	375.00	10	10	100.0	267	266	99.6	168.88	140.23	1.65	1.93	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0	190.00	484.00	10	10	100.0	260	258	99.2	319.30	287.75	1.40	1.82	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0	13.90	45.50	10	10	100.0	271	271	100.0	20.99	22.39	1.51	1.81	100.0
NNHTFR	AMMONIUM,TOTAL FILT.REAC.	mg/L	0	11.00	19.80	10	10	100.0	275	274	99.6	16.44	15.37	1.18	1.69	100.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0	19.00	32.00	10	10	100.0	273	273	100.0	26.09	25.44	1.15	1.47	100.0
PH	(-LOG(H+(CONCN))		0	6.62	7.23	10	10	100.0	275	275	100.0	6.97	6.90	1.03	1.05	100.0
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/L	0	4.13	6.33	11	11	100.0	248	248	100.0	5.30	5.18	1.13	1.51	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0	108.00	264.00	10	10	100.0	267	266	99.6	152.20	126.88	1.32	1.93	100.0
RSPLOI	RESIDUE,PART.LOSS ON IGNI.	mg/L	0	86.20	171.00	5	5	100.0	90	89	98.9	122.98	100.84	1.30	1.78	100.0
NNO2FR	NITRITE,FILT. REACT.	mg/L	0	0.01	0.05	10	7	70.0	271	58	21.4	0.02	0.01	2.61	2.98	51.4
PHENOL	PHENOLICS (4AAP)	mg/L	0	0.83	1.70	10	3	30.0	275	37	13.5	0.40	0.31	2.19	2.05	37.8
METALS																
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	920.00	3900.00	12	12	100.0	322	306	95.0	1810.00	1000.10	1.56	2.65	97.3
CCNPUR	CYANIDE-FREE,UNFILT.REAC.	ug/L	0	20.00	90.00	10	10	100.0	271	82	30.3	40.00	1.90	1.73	6.88	32.4
CUUT	COPPER,UNFILT.TOTAL	ug/L	0	110.00	120.00	2	2	100.0	49	48	98.0	110.00	110.60	1.06	2.28	97.1
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	600.00	1010.00	12	12	100.0	319	318	99.7	680.00	370.70	1.15	2.14	100.0
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	110.00	890.00	12	11	91.7	322	315	97.8	190.00	211.00	2.04	2.94	100.0
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	0.16	0.56	11	10	90.9	283	274	96.8	0.28	0.23	1.73	2.11	100.0
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	40.00	150.00	12	7	58.3	322	237	73.6	40.00	51.10	2.91	3.44	89.2
PBUT	LEAD,UNFILT.TOTAL	ug/L	0	60.00	100.00	12	4	33.3	322	57	17.7	50.00	59.50	1.44	1.86	51.4
NIUT	NICKEL,UNFILT.TOTAL	ug/L	0	20.00	50.00	12	3	25.0	322	103	32.0	20.00	38.80	2.49	2.70	54.1
MOUT	MOLYBDENUM,UNFILT.TOTAL	ug/L	0	30.00	30.00	12	2	16.7	321	41	12.8	10.00	12.40	1.53	1.72	56.8
AGUT	SILVER,UNFILT.TOTAL	ug/L	0	90.00	90.00	12	1	8.3	321	82	25.6	20.00	10.40	3.46	2.55	75.7
CDUT	CADMIUM,UNFILT.TOTAL	ug/L	0	10.00	10.00	12	1	8.3	322	76	23.6	10.00	6.50	2.23	2.09	70.3
COUT	COBALT,UNFILT.TOTAL	ug/L	0	20.00	20.00	12	1	8.3	322	82	25.5	10.00	9.30	1.96	2.31	83.8
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PMMCRE	M-CRESOL	ug/L	1	22.90	285.60	10	7	70.0	275	167	60.7	41.51	25.59	4.02	3.45	86.5
PMPHEN	PHENOL	ug/L	2	30.00	126.10	10	6	60.0	275	118	42.9	21.66	14.52	2.70	2.46	78.4
PNNAPH	NAPHTHALENE	ug/L	1	24.70	34.30	10	2	20.0	275	16	5.8	7.11	5.37	2.11	1.47	21.6
PMBBP	BUTYLBENZYLPHTHALATE	ug/L	1	11.20	11.20	10	1	10.0	275	34	12.4	5.42	5.85	1.29	1.66	37.8
X3PCPH	PENTACHLOROPHENOL	ug/L	1	29.60	29.60	10	1	10.0	275	5	1.8	13.63	12.94	1.31	1.42	10.8
DIOXINS AND FURANS																
P8CDD	OCTACHLORODIBENZODIOXIN	ng/L	1	0.85	0.85	2	1	50.0	54	4	7.4	0.92	0.87	1.12	3.66	10.8
PESTICIDES,HERBICIDES,PCBS																
P24D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	0.07	2.60	10	9	90.0	276	214	77.5	0.30	0.13	4.47	3.72	100.0
P1PCBT	PCB, TOTAL	ug/L	2	0.10	0.10	10	3	30.0	276	42	15.2	0.05	0.06	1.56	2.31	46.0
P1BHCG	GAMMA-BHC(HEXCHLORCYCLHEXANE)	ug/L	2	0.03	0.03	10	1	10.0	276	143	51.8	0.01	0.02	1.42	2.29	94.6
P1CHLG	GAMMA-CHLORDANE	ug/L	1	0.02	0.02	10	1	10.0	276	9	3.3	0.01	0.01	1.25	1.49	16.2
P1HEPE	HEPTACHLOREPOXIDE	ug/L	2	0.02	0.02	10	1	10.0	276	2	0.7	0.01	0.01	1.25	1.19	5.4
P245T	2,4,5-TRICLORPHENOXYACETIC ACID	ug/L	3	0.07	0.07	10	1	10.0	276	22	8.0	0.05	0.06	1.11	1.60	37.8
P5SILV	SILVEX	ug/L	3	0.08	0.08	10	1	10.0	276	28	10.1	0.05	0.06	1.16	1.68	40.5

PLANT NAME : Burlington (Skyway)
PLANT TYPE : Secondary

SAMPLING TYPE : Raw Sewage
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	PLANT MIN. CONC. > - DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
VOLATILES ORGANIC COMPOUNDS																
X1TETR	TETRACHLOROETHYLENE	ug/L	1	40.00	54.00	10	2	20.0	274	12	4.4	23.67	21.51	1.44	1.53	18.9
B2EBNZ	ETHYLBENZENE	ug/L	1	110.00	110.00	10	1	10.0	274	30	11.0	23.72	23.50	1.71	1.75	29.7
B2MPXY	M-, AND P-XYLENES	ug/L	1	160.00	160.00	10	1	10.0	274	43	15.7	24.62	26.00	1.93	2.02	37.8
B2OXYL	O-XYLENE	ug/L	1	93.00	93.00	10	1	10.0	274	25	9.1	23.32	22.47	1.63	1.56	24.3
L1HEX	HEXANOL	ug/L	2	5000.00	5000.00	10	1	10.0	274	1	0.4	1342.90	1368.56	9.20	7.08	2.7
X113DP	CIS-1,3-DICHLOROPROPENE	ug/L	1	40.00	40.00	10	1	10.0	274	1	0.4	26.25	29.24	1.28	1.11	2.7
X1CHLO	CHLOROFORM	ug/L	1	260.00	260.00	10	1	10.0	274	28	10.2	25.85	23.90	2.25	1.75	32.4

PLANT NAME : Burlington (Skyway)
PLANT TYPE : Secondary

SAMPLING TYPE : Final Effluent
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	STD. FOR SURFACE WATER	STD. REF.	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET.	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																		
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0		-	12.40	71.70	10	10	100.0	213	211	99.1	35.67	21.22	1.79	2.07	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0		-	26.00	132.00	10	10	100.0	213	211	99.1	47.80	52.80	1.67	1.83	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0		-	5.60	9.40	10	10	100.0	220	220	100.0	7.27	8.09	1.22	1.60	100.0
NNHTPR	AMMONIUM,TOTAL PILT.REAC.	mg/L	0		-	9.20	19.70	10	10	100.0	223	204	91.5	13.71	3.90	1.37	6.98	100.0
NNO2PR	NITRITE,PILT. REACT.	mg/L	0		-	0.03	1.00	10	10	100.0	220	194	88.2	0.13	0.22	4.66	5.95	96.4
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0		-	11.90	25.60	10	10	100.0	222	222	100.0	17.39	7.97	1.33	2.71	100.0
PH	(-LOG(H+(CONCN))		0		-	6.65	7.45	10	10	100.0	224	224	100.0	7.10	7.10	1.04	1.05	100.0
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/L	0		-	1.15	3.23	11	11	100.0	211	206	97.6	1.55	0.68	1.41	1.97	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0		-	7.70	242.00	10	10	100.0	220	219	99.6	19.56	10.12	3.02	2.00	100.0
RSPLOI	RESIDUE,PAR.LOSS ON IGNI.	mg/L	0		-	10.20	162.00	5	5	100.0	77	58	75.3	31.71	7.47	2.81	2.71	93.3
NNOTPR	NITRATES,TOTAL FILT.REAC.	mg/L	0		-	2.65	5.55	10	5	50.0	224	166	83.0	0.48	2.33	10.18	7.75	96.4
PHNOL	PHENOLICS (4AAP)	mg/L	0	0.00	ONT-MOE	0.10	0.57	10	4	40.0	225	33	14.7	0.11	0.07	2.47	1.86	53.6
METALS																		
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	75.00	ONT-MOE	90.00	990.00	12	12	100.0	264	196	74.2	210.00	101.70	2.07	3.72	96.4
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	3750.00	ONT-MOE	120.00	1200.00	12	12	100.0	267	267	100.0	530.00	340.90	1.69	2.14	100.0
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	30.00	ONT-MOE	30.00	180.00	12	11	91.7	267	262	98.1	60.00	53.30	1.90	2.48	100.0
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	200.00	ONT-MOE	0.01	0.17	11	10	90.9	233	220	94.4	0.04	0.03	3.40	2.62	100.0
CUUT	COPPER,UNFILT.TOTAL	ug/L	0	8.28	ONT-MOE	30.00	30.00	2	1	50.0	47	30	63.8	10.00	13.10	3.55	2.56	77.8
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	100.00	ONT-MOE	10.00	20.00	12	5	41.7	267	137	51.3	10.00	9.00	1.78	2.00	89.3
CDUT	CADMIUM,UNFILT.TOTAL	ug/L	0	0.20	ONT-MOE	10.00	10.00	12	3	25.0	267	65	24.3	0.00	2.10	2.71	2.07	71.4
NIUT	NICKEL,UNFILT.TOTAL	ug/L	0	25.00	ONT-MOE	20.00	30.00	12	3	25.0	267	171	64.0	10.00	22.10	2.13	3.60	83.7
CCNFUR	CYANIDE-FREE,UNFILT.REAC.	ug/L	0	5.00	ONT-MOE	10.00	10.00	10	2	20.0	222	42	18.9	0.00	1.30	1.88	3.68	46.4
COUT	COBALT,UNFILT.TOTAL	ug/L	0	5.00	NYS-STD	10.00	10.00	12	2	16.7	266	65	24.4	10.00	6.40	1.66	1.54	82.1
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																		
PMMCRE	M-CRESOL	ug/L	1		-	11.30	12.40	10	2	20.0	227	7	3.1	2.74	1.70	2.50	1.70	14.3
X3PCPH	PENTACHLOROPHENOL	ug/L	1	0.50	ONT-MOE	6.80	7.00	10	2	20.0	227	3	1.3	3.66	2.71	1.82	1.56	7.1
DIOXINS AND FURANS																		
P7CDD	HEPTACHLORODIBENZODIOXIN	ng/L	1	1.50	ONT-MOE	4.30	4.30	2	1	50.0	44	2	4.6	0.66	0.38	14.29	3.74	7.1
P8CDD	OCTACHLORODIBENZODIOXIN	ng/L	1	150.00	ONT-MOE	11.00	11.00	2	1	50.0	44	4	9.1	1.48	0.31	17.01	3.43	14.3
PESTICIDES,HERBICIDES,PCBS																		
P24D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	4.00	ONT-MOE	0.04	2.60	10	9	90.0	227	177	78.0	0.34	0.08	4.49	4.71	100.0
P1BHCG	GAMMA-BHC(HEXCHLORCYCLHEXANE)	ug/L	2	0.06	ONT-MOE	0.02	0.02	10	5	50.0	227	157	69.2	0.01	0.02	2.08	2.48	96.4
P245T	2,4,5-TRICLORPHENOXYACETIC ACID	ug/L	3		-	0.06	0.85	10	5	50.0	227	25	11.0	0.06	0.03	3.21	2.27	42.9
P5SIL.V	SILVEX	ug/L	3		-	0.05	0.12	10	3	30.0	227	23	10.1	0.04	0.03	1.87	1.83	50.0
P1PCBT	PCB, TOTAL	ug/L	2	0.00	ONT-MOE	0.09	0.09	10	1	10.0	227	9	4.0	0.02	0.02	1.61	1.40	28.6
X2124	1,2,4-TRICHLOROBENZENE	ug/L	3	0.50	ONT-MOE	0.10	0.10	10	1	10.0	227	36	15.9	0.01	0.01	2.52	2.44	32.1
X2HCE	HEXACHLOROETHANE	ug/L	3		-	0.01	0.01	10	1	10.0	227	5	2.2	0.01	0.01	1.34	1.23	14.3

PLANT NAME : Burlington (Skyway)
PLANT TYPE : Secondary

SAMPLING TYPE : Final Effluent
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	STD. FOR SURFACE WATER	STD. REF.	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET.	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
VOLATILES ORGANIC COMPOUNDS																		
B2MPXY	M-, AND P-XYLENES	ug/L	1	50.00	NYS-GUL	15.00	15.00	10	1	10.0	224	5	2.2	1.31	1.05	2.35	1.45	10.7
B2OXYL	O-XYLENE	ug/L	1	100.00	ONT-MOE	13.00	13.00	10	1	10.0	224	5	2.2	1.29	1.05	2.25	1.38	14.3
X1111T	1,1,1-TRICHLOROETHANE	ug/L	1	50.00	NYS-GUL	12.00	12.00	10	1	10.0	224	18	8.0	1.28	1.18	2.19	1.86	28.6
X1BDCM	BROMODICHLOROMETHANE	ug/L	1	50.00	NYS-GUL	4.10	4.10	10	1	10.0	224	7	3.1	1.66	1.55	1.37	1.20	17.9
X1CHLO	CHLOROFORM	ug/L	1	0.20	NYS-STD	12.00	12.00	10	1	10.0	224	37	16.5	1.28	1.37	2.19	2.18	64.3
X1TETR	TETRACHLOROETHYLENE	ug/L	1	0.70	NYS-GUL	10.00	10.00	10	1	10.0	224	18	8.0	1.26	1.18	2.07	1.93	32.1
X1TRIC	TRICHLOROETHYLENE	ug/L	1	3.00	NYS-GUL	5.90	5.90	10	1	10.0	224	17	7.6	1.19	1.12	1.75	1.55	21.4

PLANT NAME : Burlington (Skyway)
PLANT TYPE : Secondary

SAMPLING TYPE : Raw Sludge
SAMPLE FORM : Dry Weight

CONTAM-INANT	CONTAMINANT NAME	UNIT	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
COD	CHEMICAL OXYGEN DEMAND	mg/kg	0	658892.13	1299135.45	2	2	100.0	45	45	100.0	925197.34	892221.45	1.62	3.19	100.0
NNHTPR	AMMONIUM,TOTAL FILT.REAC.	mg/kg	0	8328.53	8328.53	1	1	100.0	48	47	97.9	8328.53	5911.32	0.00	4.59	100.0
NNOTPR	NITRATES,TOTAL FILT.REAC.	mg/kg	0	30.26	30.26	1	1	100.0	48	43	89.6	30.26	25.44	0.00	2.21	93.9
NNTKUR	NITROGEN-TOT-KJEL.,UNF.TOT	mg/kg	0	40233.24	43227.67	2	2	100.0	51	51	100.0	41703.58	36897.85	1.05	2.98	100.0
PH	(-LOG(H+(CONCN))	mg/kg	0	6.40	6.40	1	1	100.0	49	49	100.0	6.40	6.03	0.00	1.10	100.0
PHNOL	PHENOLICS (4AAP)	mg/kg	0	46.65	213.26	2	2	100.0	50	41	82.0	99.74	82.34	2.93	3.54	85.3
PPUT	PHOSPHORUS,UNFILT.TOTAL.	mg/kg	0	31412.10	37317.78	2	2	100.0	42	42	100.0	34237.85	20347.70	1.13	4.43	100.0
RST	RESIDUE, TOTAL.	mg/kg	0	34300.00	34700.00	2	2	100.0	51	51	100.0	34499.42	32783.51	1.01	1.81	100.0
RSTLOI	RESIDUE,TOT.LOSS ON IGNI.	mg/kg	0	19600.00	21300.00	2	2	100.0	51	51	100.0	20432.33	20803.05	1.06	1.77	100.0
METALS																
AGUT	SILVER,UNFILT.TOTAL.	mg/kg	0	27.11	31.70	2	2	100.0	45	40	88.9	29.32	30.17	1.12	2.61	84.4
ALUT	ALUMINUM,UNFILT.TOTAL.	mg/kg	0	11078.72	12680.12	2	2	100.0	51	51	100.0	11852.40	9835.74	1.10	2.51	100.0
ASUT	ARSENIC,UNFILT.TOTAL.	mg/kg	0	9.62	12.97	2	2	100.0	51	50	98.0	11.17	6.13	1.26	2.01	97.1
CDUT	CADMIUM,UNFILT.TOTAL.	mg/kg	0	23.05	32.07	2	2	100.0	43	40	93.0	27.19	9.74	1.26	4.35	90.0
COUT	COBALT,UNFILT.TOTAL.	mg/kg	0	13.41	13.41	1	1	100.0	41	30	73.2	13.41	9.29	0.00	4.69	73.3
CRUT	CHROMIUM,UNFILT.TOTAL.	mg/kg	0	230.55	320.70	2	2	100.0	51	50	98.0	271.91	301.43	1.26	3.68	97.1
CUUT	COPPER,UNFILT.TOTAL.	mg/kg	0	903.79	1055.33	2	2	100.0	46	46	100.0	976.63	606.31	1.12	1.72	100.0
HGUT	MERCURY,UNFILT.TOTAL.	mg/kg	0	2.59	3.21	2	2	100.0	50	50	100.0	2.88	2.23	1.16	1.67	100.0
NIUT	NICKEL,UNFILT.TOTAL.	mg/kg	0	24.78	43.73	2	2	100.0	46	44	95.7	32.92	59.17	1.49	2.90	93.3
PBUT	LEAD,UNFILT.TOTAL.	mg/kg	0	154.52	187.32	2	2	100.0	49	48	98.0	170.13	173.99	1.15	2.24	96.9
SEUT	SELENIUM,UNFILT.TOTAL.	mg/kg	0	2.04	3.75	2	2	100.0	50	48	96.0	2.77	3.04	1.54	1.93	93.9
SRUT	STRONTIUM,UNFILT.TOTAL.	mg/kg	0	379.01	504.32	2	2	100.0	51	51	100.0	437.20	231.70	1.22	1.97	100.0
ZNUT	ZINC,UNFILT.TOTAL.	mg/kg	0	1095.10	1720.12	2	2	100.0	51	51	100.0	1372.48	905.39	1.38	2.39	100.0
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PMMCRE	M-CRESOL	ug/kg	1	303207.00	778098.00	2	2	100.0	51	42	82.3	485720.90	116847.30	1.95	12.16	85.3
PMPHEN	PHENOL	ug/kg	2	13702.60	13702.60	2	1	50.0	51	15	29.4	7696.30	7312.80	2.26	3.00	38.2
PNNAPH	NAPHTHALENE	ug/kg	1	6608.10	6608.10	2	1	50.0	51	6	11.8	4389.30	3823.30	1.78	3.75	14.7
DIOXINS AND FURANS																
P9HCDD	OCTACHLORODIBENZODIOXIN	ug/kg	1	61.20	98.00	2	2	100.0	50	25	50.0	77.40	8.50	1.40	3.60	58.8
P97CDD	HEPTACHLORODIBENZODIOXIN	ug/kg	1	14.30	14.30	2	1	50.0	50	6	12.0	6.40	7.20	3.09	4.12	17.7
PESTICIDES,HERBICIDES,PCBS																
P1PCBT	PCB, TOTAL	ug/kg	2	172.00	190.20	2	2	100.0	51	40	78.4	180.90	88.70	1.07	3.18	79.4
P245T	2,4,5-TRICLORPHENOXYACETIC	ug/kg	3	110.80	282.40	2	2	100.0	51	21	41.2	176.90	48.90	1.94	3.49	47.1
P24D	2,4-DICHLOROPHENOXYACETIC	ug/kg	3	49.60	187.30	2	2	100.0	51	38	74.5	96.40	93.20	2.56	6.50	82.3
P1HCG	GAMMA-HEXACHLORCYCLOHEX	ug/kg	2	11.50	11.50	2	1	50.0	51	28	54.9	5.80	8.90	2.65	2.69	67.7
P1DRL	DIELDRIN	ug/kg	2	72.00	72.00	2	1	50.0	51	20	39.2	14.40	7.20	9.69	3.10	50.0
P1ENDI	ENDOSULFAN I	ug/kg	3	31.70	31.70	2	1	50.0	51	9	17.7	9.60	4.60	5.43	2.56	20.6
P1HEPE	HEPTACHLOREPOXIDE	ug/kg	2	11.50	11.50	2	1	50.0	51	12	23.5	5.80	5.00	2.65	2.62	32.4
P1PPDE	PP-DDE	ug/kg	1	5.80	5.80	2	1	50.0	51	22	43.1	7.40	7.30	1.41	2.31	52.9
P3SILV	SILVEX	ug/kg	3	233.40	233.40	2	1	50.0	51	23	45.1	58.40	47.30	7.10	3.40	55.9

PLANT NAME : Burlington (Skyway)
PLANT TYPE : Secondary

SAMPLING TYPE : Treated Sludge
SAMPLE FORM : Dry Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
COD	CHEMICAL OXYGEN DEMAND	mg/kg	0	96551.72	597359.74	2	2	100.0	36	36	100.0	240158.52	508097.94	3.63	4.65	100.0
NNHTPR	AMMONIA,M,TOTAL.FIL.T.REAC.	mg/kg	0	8132.18	8132.18	1	1	100.0	25	25	100.0	8132.18	17658.28	0.00	2.92	100.0
NNOTPR	NITRATES,TOTAL.FIL.T.REAC.	mg/kg	0	27.30	27.30	1	1	100.0	26	23	88.5	27.30	42.68	0.00	2.29	95.0
NNTKUR	NITROGEN-TOT-KJBL,UNF.TOT	mg/kg	0	40229.89	53795.38	2	2	100.0	49	49	100.0	46520.77	38494.12	1.23	1.77	100.0
PH	(-LOG(H+(CONCN))	mg/kg	0	7.83	7.83	1	1	100.0	47	47	100.0	7.83	7.17	0.00	1.09	100.0
PHENOL	PHENOLICS (4AAP)	mg/kg	0	29.70	287.36	2	2	100.0	49	41	83.7	92.39	43.05	4.98	3.14	87.9
PPUT	PHOSPHORUS,UNFIL.T.TOTAL.	mg/kg	0	32471.26	34653.47	2	2	100.0	43	43	100.0	33564.62	76638.67	1.05	6.91	100.0
RST	RESIDUE, TOTAL	mg/kg	0	30300.00	34800.00	2	2	100.0	50	50	100.0	32472.14	80434.04	1.10	3.23	100.0
RSTLOI	RESIDUE,TOT.LOSS ON IGNI.	mg/kg	0	17000.00	21400.00	2	2	100.0	50	50	100.0	19073.54	43379.33	1.18	3.19	100.0
METALS																
AGUT	SILVER,UNFIL.T.TOTAL.	mg/kg	0	18.81	48.85	2	2	100.0	44	44	100.0	30.31	37.78	1.96	2.33	100.0
AlUT	ALUMINUM,UNFIL.T.TOTAL.	mg/kg	0	7260.75	17261.38	2	2	100.0	50	50	100.0	11188.61	10715.94	1.84	2.82	100.0
ASUT	ARSENIC,UNFIL.T.TOTAL.	mg/kg	0	5.94	23.56	2	2	100.0	50	49	98.0	11.83	5.40	2.65	2.06	97.1
CDUT	CADMIUM,UNFIL.T.TOTAL.	mg/kg	0	29.04	31.61	2	2	100.0	45	41	91.1	30.30	10.47	1.06	3.98	90.3
COUT	COBALT,UNFIL.T.TOTAL.	mg/kg	0	18.81	18.81	1	1	100.0	39	32	82.1	18.81	9.14	0.00	2.75	85.7
CRUT	CHROMIUM,UNFIL.T.TOTAL.	mg/kg	0	238.42	431.03	2	2	100.0	50	50	100.0	311.02	333.06	1.59	3.59	100.0
CUUT	COPPER,UNFIL.T.TOTAL.	mg/kg	0	627.06	1547.41	2	2	100.0	45	45	100.0	985.05	732.24	1.89	2.16	100.0
HGUT	MERCURY,UNFIL.T.TOTAL.	mg/kg	0	4.60	4.95	2	2	100.0	50	49	98.0	4.77	3.24	1.05	2.04	97.1
MOUT	MOLYBDENUM,UNFIL.T.TOTAL.	mg/kg	0	4.95	10.63	2	2	100.0	34	23	67.7	7.26	6.41	1.72	2.84	69.2
NIUT	NICKEL,UNFIL.T.TOTAL.	mg/kg	0	33.00	43.10	2	2	100.0	45	42	93.3	37.72	72.95	1.21	2.95	90.0
PBUT	LEAD,UNFIL.T.TOTAL.	mg/kg	0	141.91	344.83	2	2	100.0	50	49	98.0	221.21	196.62	1.87	2.46	97.1
SEUT	SELENIUM,UNFIL.T.TOTAL.	mg/kg	0	1.32	3.75	2	2	100.0	50	48	96.0	2.75	2.67	2.83	2.98	97.1
SRUT	STRONTIUM,UNFIL.T.TOTAL.	mg/kg	0	297.03	689.66	2	2	100.0	50	50	100.0	452.60	240.93	1.81	2.54	100.0
ZNUT	ZINC,UNFIL.T.TOTAL.	mg/kg	0	1188.12	1609.20	2	2	100.0	50	50	100.0	1382.72	988.90	1.24	2.57	100.0
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PMMCRE	M-CRESOL	ug/kg	1	13433.90	13433.90	2	1	50.0	50	15	30.0	8155.00	5281.80	2.03	8.20	35.3
PNFLAN	FLUORANTHENE	ug/kg	1	6379.30	6379.30	2	1	50.0	50	4	8.0	4588.40	1338.90	1.59	4.26	8.8
PNNAPH	NAPHTHALENE	ug/kg	1	7327.60	7327.60	2	1	50.0	50	6	12.0	4917.60	1545.60	1.76	3.77	14.7
PNPYR	PYRENE	ug/kg	1	10422.40	10422.40	2	1	50.0	50	3	6.0	7183.00	2124.30	1.69	3.44	8.8
DIOXINS AND FURANS																
P98CDD	OCTACHLORODIBENZODIOXIN	ug/kg	1	51.70	303.60	2	2	100.0	49	26	53.1	125.30	7.10	3.50	3.84	64.7
P97CDD	HEPTACHLORODIBENZODIOXIN	ug/kg	1	72.60	72.60	2	1	50.0	49	10	20.4	14.50	5.00	9.75	3.21	23.5
PESTICIDES,HERBICIDES,PCBS																
P1PCBT	PCB, TOTAL	ug/kg	2	188.10	206.90	2	2	100.0	50	32	64.0	197.30	114.10	1.07	4.58	67.7
P1PPDE	PP-DDE	ug/kg	1	6.60	14.40	2	2	100.0	50	34	68.0	9.70	11.10	1.74	2.72	73.5
P345T	2,4,5-TRICLORPHENOXYACETIC	ug/kg	3	125.40	804.60	2	2	100.0	50	16	32.0	317.60	84.40	3.72	3.13	41.2
P24D	2,4-DICHLOROPHENOXYACETIC	ug/kg	3	66.00	1436.80	2	2	100.0	50	25	50.0	307.90	75.00	8.83	5.81	64.7
P1ALDR	ALDRIN	ug/kg	1	77.60	77.60	2	1	50.0	50	11	22.0	16.00	5.30	9.33	2.67	26.5
P1MIRX	MIREX	ug/kg	1	37.40	37.40	2	1	50.0	50	8	16.0	11.10	4.90	5.57	2.52	17.7
P3SILV	SILVEX	ug/kg	3	718.40	718.40	2	1	50.0	50	18	36.0	108.90	92.70	14.42	2.94	44.1

PLANT NAME : Burlington (Skyway)
PLANT TYPE : Secondary

SAMPLING TYPE : Treated Sludge
SAMPLE FORM : Dry Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
VOLATILE ORGANIC COMPOUNDS																
B2MPXY	M-, AND P-XYLENES	ug/kg	1	3960.40	3960.40	2	1	50.0	50	15	30.0	1508.70	816.00	3.92	7.11	32.4
L1HEX	HEXANOL	ug/kg	2	143678.20	143678.20	2	1	50.0	50	1	2.0	108879.00	11979.20	1.48	14.28	2.9

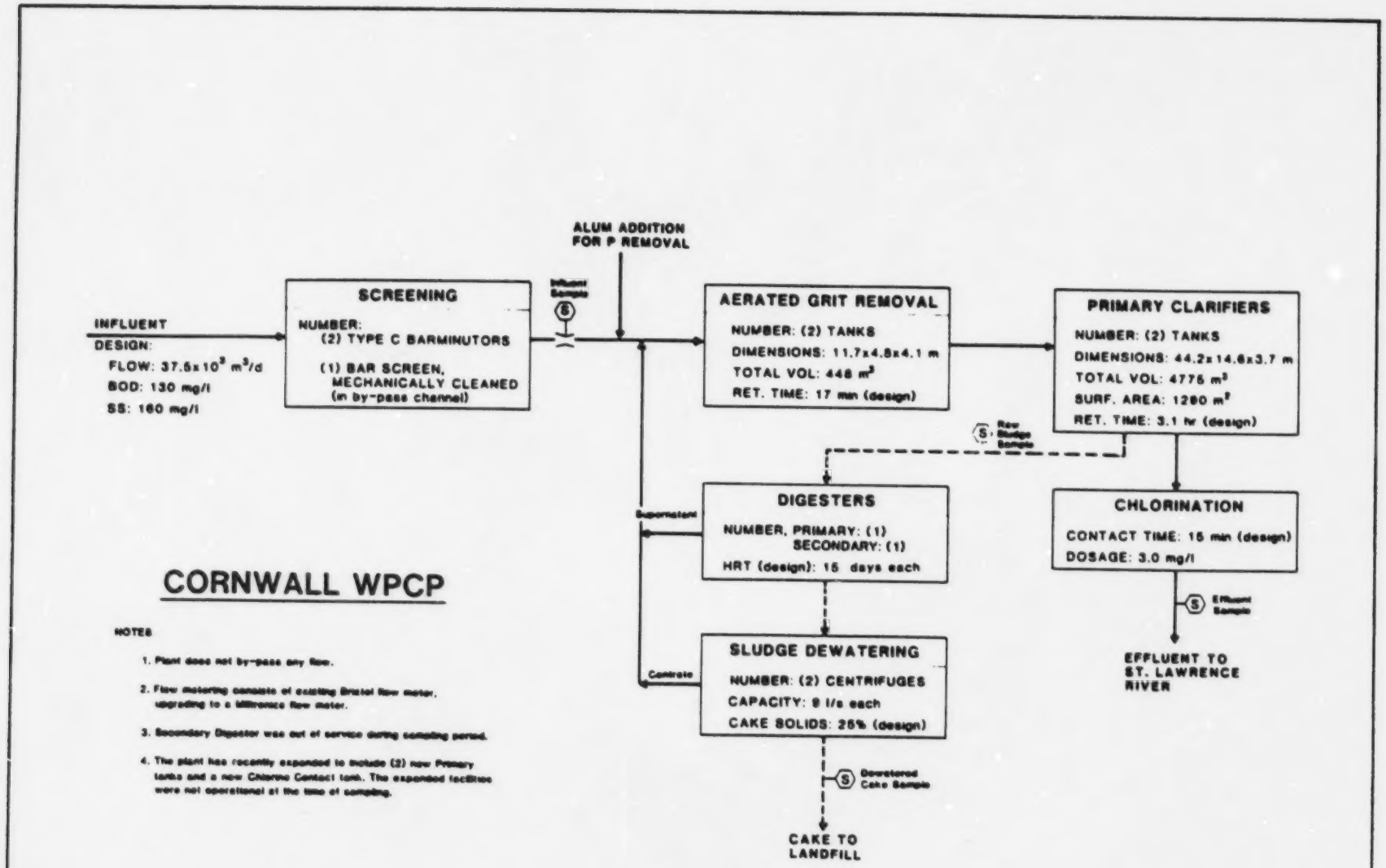
Sub-Appendix A-4

Cornwall WPCP

Contents:

- Plant Schematic with Design Characteristics
- Annual Data Review (1981 - 1986 Plant Performance)
- Sources of Municipal Water Pollution Control Plant Raw Sewage
- Operational Evaluation for Cornwall WPCP
- Analytical Data

(KIR18/28A)


ALUM ADDITION FOR P REMOVAL
INFLUENT
DESIGN:
FLOW: 37.5x10³ m³/d
BOD: 130 mg/l
SS: 160 mg/l
SCREENING
NUMBER:
(2) TYPE C BARMINUTORS
(1) BAR SCREEN, MECHANICALLY CLEANED (in by-pass channel)
Influent Sample
AERATED GRIT REMOVAL
NUMBER: (2) TANKS
DIMENSIONS: 11.7x4.8x4.1 m
TOTAL VOL: 448 m³
RET. TIME: 17 min (design)
PRIMARY CLARIFIERS
NUMBER: (2) TANKS
DIMENSIONS: 44.2x14.6x3.7 m
TOTAL VOL: 4776 m³
SURF. AREA: 1280 m²
RET. TIME: 3.1 hr (design)
Raw Sludge Sample
DIGESTERS
NUMBER, PRIMARY: (1)
SECONDARY: (1)
HRT (design): 15 days each
Supernatant
CHLORINATION
CONTACT TIME: 15 min (design)
DOSAGE: 3.0 mg/l
Effluent Sample
EFFLUENT TO ST. LAWRENCE RIVER
SLUDGE DEWATERING
NUMBER: (2) CENTRIFUGES
CAPACITY: 8 l/s each
CAKE SOLIDS: 25% (design)
Centrate
Dewatered Cake Sample
CAKE TO LANDFILL
CORNWALL WPCP
NOTES
1. Plant does not by-pass any flow.
2. Flow metering consists of existing Bristol flow meter, upgrading to a Milltronics flow meter.
3. Secondary Digestor was out of service during sampling period.
4. The plant has recently expanded to include (2) new Primary tanks and a new Chlorine Contact tank. The expanded facilities were not operational at the time of sampling.
CANVIRO

CORNWALL WPCP
Primary
Phosphorus Removal - Continuous
Capacity - 37.585 10(3)m3/day

PARAMETER	1981	1982	1983	1984	1985	5 YEAR AVERAGE 81-85
Avg. Daily Flow (1000 m3/day)	48.64	47.59	49.15	48.54	47.67	48.32
BOD5 - Influent (mg/L)	55.73	79.61	77.82	88.67	72.58	74.86
BOD5 - Effluent (mg/L)	37.47	47.37	39.22	45.58	40.40	42.01
Annual BOD5 Significantly Different from Mean Annual Average BOD5?	N	N	N	N	N	
TSS - Influent (mg/L)	119.84	92.16	92.92	110.25	105.83	104.20
TSS - Effluent (mg/L)	52.60	46.90	28.48	23.69	24.45	35.22
Annual TSS Significantly Different from Mean Annual Average TSS?	Y	Y	N	Y	Y	
Total P - Influent (mg/L)	2.74	2.73	2.60	2.65	2.65	2.69
Total P - Effluent (mg/L)	1.67	1.58	0.99	0.90	0.99	1.24
Annual TP Significantly Different from Mean Annual Average TP?	Y	Y	N	N	N	
TP in Compliance?	N	N	Y	Y	Y	N

I.D. - Insufficient Data

R
R

SOURCES OF MUNICIPAL WATER POLLUTION CONTROL PLANT RAW SEWAGE

GENERAL DESCRIPTION OF WATER POLLUTION CONTROL PLANT (WPCP)

NAME OF WPCP	CORNWALL WPCP
WORKS NUMBER	110000132
TREATMENT TYPE	PRIMARY PHOSPHORUS REMOVAL CONTINUOUS
DESIGN CAPACITY (1000 m3/d)	37.505
1986 AVERAGE DAY FLOW (1000 m3/d)	52.927
POPULATION SERVED	46800

% OF TOTAL FLOW ATTRIBUTED TO:

INDUSTRIAL SOURCES (%)	10
COMMERCIAL SOURCES (%) (Population x 0.0757)	7
RESIDENTIAL SOURCES (%) (Population x 0.175)	15
UNACCOUNTED FOR, INCL. INFILTRATION (100-% Contributed from industrial, commercial and residential sources)	68

PROFILE OF INDUSTRIES IN CATCHMENT

TOTAL NO OF INDUSTRIES	111
INDUSTRIES WITH WATER	23
NO OF SIC CATEGORIES	34

DESCRIPTION OF THE TOP 5 INDUSTRIES DISCHARGED TO THE WPCP
(BASED ON WATER USE DATA)

DESCRIPTION	SIC	# OF COMPANIES
ORGANIC CHEMICAL & PESTICIDES	2869-2869	3
TEXTILE PRODUCTS	2271-2299	5
DAIRY	2021-2026	2
PLASTICS, RESIGNS, SYNTHETICS	2821-2824	1
PRIMARY TEXTILES	2211-2269	3

OPERATIONAL EVALUATION FOR: C O R N W A L L W P C P

TREATMENT FACILITY: Primary
PERIOD ENDING: May 8, 1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 37,500 m3/d

PARAMETER	PRE-SAMPLING PERIOD						
	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
RAW SEWAGE FLOW							
% of Design Flow							
Influent BOD (mg/L)							
Primary BOD (mg/L)							
Secondary BOD (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent SS (mg/L)							
Primary SS (mg/L)							
Secondary SS (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)							
Primary Total P (mg/L)							
Secondary Total P (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							

OPERATIONAL EVALUATION FOR: C O R N W A L L W P C P

TREATMENT FACILITY: Primary
PERIOD ENDING: May 8, 1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 37,500 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 8	DAY 9	DAY 10	DAY 11	DAY 12	DAY 13	DAY 14
RAW SEWAGE FLOW		52,020	56,430	48,460	43,630	43,140	37,590
% of Design Flow		138.72%	150.48%	129.23%	116.35%	115.04%	100.24%
Influent BOD (mg/L)		52.0					
Primary BOD (mg/L)							
Secondary BOD (mg/L)		49.0					
% PRIMARY REMOVAL							
% SECONDARY REMOVAL		5.8%					
Influent SS (mg/L)		133.0					
Primary SS (mg/L)							
Secondary SS (mg/L)		28.0					
% PRIMARY REMOVAL							
% SECONDARY REMOVAL		78.9%					
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)		15.2					
Primary TKN (mg/L)							
Secondary TKN (mg/L)		14.8					
% PRIMARY REMOVAL							
% SECONDARY REMOVAL		2.6%					
Influent Total P (mg/L)		1.80	1.80	2.30			
Primary Total P (mg/L)							
Secondary Total P (mg/L)		0.80	0.80	0.80			
% PRIMARY REMOVAL							
% SECONDARY REMOVAL		55.6%	55.6%	65.2%			

OPERATIONAL EVALUATION FOR: C O R N W A L L W P C P

TREATMENT FACILITY: Primary
PERIOD ENDING: May 8, 1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 37,500 m3/d

PARAMETER	SAMPLING PERIOD						
	DAY 15	DAY 16	DAY 17	DAY 18	DAY 19	DAY 20	DAY 21
RAW SEWAGE FLOW	41,620	41,220	42,660	43,890	42,330	39,460	
% of Design Flow	110.99%	109.92%	113.76%	117.04%	112.88%	105.23%	
Influent BOD (mg/L)							
Primary BOD (mg/L)							
Secondary BOD (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent SS (mg/L)	157.0						
Primary SS (mg/L)							
Secondary SS (mg/L)	29.0						
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	81.5						
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)	3.20	2.30	2.50			3.30	
Primary Total P (mg/L)							
Secondary Total P (mg/L)	1.30	1.90	1.40			1.40	
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	59.4	17.4	44.0			57.6	

OPERATIONAL EVALUATION FOR: C O R N W A L L W P C P

TREATMENT FACILITY: Primary
PERIOD ENDING: April 3, 1987
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: 37,500 m3/d

PARAMETER	PRE-SAMPLING PERIOD DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
RAW SEWAGE FLOW							
% of Design Flow							
Influent BOD (mg/L)							
Primary BOD (mg/L)							
Secondary BOD (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent SS (mg/L)							
Primary SS (mg/L)							
Secondary SS (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)							
Primary Total P (mg/L)							
Secondary Total P (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							

OPERATIONAL EVALUATION FOR: CORNWALL WPCP

TREATMENT FACILITY: Primary
PERIOD ENDING: April 3, 1987
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: 37,500 m3/d

PARAMETER	PRE-SAMPLING PERIOD						
	DAY 8	DAY 9	DAY 10	DAY 11	DAY 12	DAY 13	DAY 14
RAW SEWAGE FLOW							
% of Design Flow							
Influent BOD (mg/L)							
Primary BOD (mg/L)							
Secondary BOD (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent SS (mg/L)							
Primary SS (mg/L)							
Secondary SS (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)							
Primary Total P (mg/L)							
Secondary Total P (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							

OPERATIONAL EVALUATION FOR: C O R N W A L L W P C P

TREATMENT FACILITY: Primary
PERIOD ENDING: April 3, 1987
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: 37,500 m3/d

PARAMETER	SAMPLING PERIOD						
	DAY 15	DAY 16	DAY 17	DAY 18	DAY 19	DAY 20	DAY 21
RAW SEWAGE FLOW	62,120	66,110	57,460	54,870	55,090		
% of Design Flow	165.65%	176.29%	153.23%	146.32%	146.91%		
Influent BOD (mg/L)							
Primary BOD (mg/L)							
Secondary BOD (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent SS (mg/L)	94.0						
Primary SS (mg/L)							
Secondary SS (mg/L)	35.0						
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	62.8						
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)	1.80	1.50	1.80	1.80			
Primary Total P (mg/L)							
Secondary Total P (mg/L)	1.20	0.70	0.90	1.00			
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	33.3	53.3	50.0	44.4			

PLANT NAME : Cornwall
PLANT TYPE : Primary

SAMPLING TYPE : Raw Sewage
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	PLANT MIN. CONC. > 5 DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0	29.40	134.00	10	10	100.0	287	266	99.6	60.41	140.23	1.54	1.93	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0	66.00	222.00	10	10	100.0	260	258	99.2	135.86	287.75	1.57	1.82	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0	9.00	18.50	10	10	100.0	271	271	100.0	12.53	22.39	1.27	1.81	100.0
NNHTPR	AMMONIUM,TOTAL FIL.T.REAC.	mg/L	0	4.55	9.75	10	10	100.0	275	274	99.6	6.35	15.37	1.30	1.69	100.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0	8.50	16.30	10	10	100.0	273	273	100.0	12.36	25.44	1.30	1.47	100.0
PH	(-LOG(H+)=(CONCN))		0	6.78	7.06	10	10	100.0	275	275	100.0	6.91	6.90	1.01	1.05	100.0
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/L	0	1.63	3.55	10	10	100.0	248	248	100.0	2.54	5.18	1.40	1.51	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0	35.30	94.20	8	8	100.0	267	266	99.6	54.45	126.88	1.42	1.93	100.0
METALS																
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	610.00	3600.00	11	11	100.0	322	306	95.0	1450.00	1000.10	1.85	2.65	97.3
CUUT	COPPER,UNFILT.TOTAL	ug/L	0	30.00	30.00	1	1	100.0	49	48	98.0	30.00	110.60	0.00	2.28	97.1
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	0.06	0.20	10	10	100.0	285	274	96.8	0.13	0.23	1.44	2.11	100.0
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	800.00	1200.00	11	11	100.0	319	318	99.7	940.00	370.70	1.13	2.14	100.0
ZNUT	ZINC,UNFIL.T.TOTAL	ug/L	0	50.00	100.00	11	11	100.0	322	315	97.8	60.00	211.00	1.27	2.94	100.0
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	20.00	50.00	11	7	63.6	322	237	73.6	30.00	51.10	1.95	3.44	89.2
COUT	COBALT,UNFILT.TOTAL	ug/L	0	10.00	20.00	11	3	27.3	322	83	25.5	10.00	9.30	1.77	2.31	83.8
AGUT	SILVER,UNFILT.TOTAL	ug/L	0	10.00	30.00	11	2	18.2	321	82	25.6	10.00	10.40	1.75	2.55	75.7
MOUT	MOLYBDENUM,UNFILT.TOTAL	ug/L	0	40.00	40.00	11	1	9.1	321	41	12.8	10.00	12.40	1.52	1.72	56.8
PBUT	LEAD,UNFILT.TOTAL	ug/L	0	130.00	130.00	11	1	9.1	322	57	17.7	50.00	59.50	1.33	1.86	51.4
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PMMCRR	M-CRESOL	ug/L	1	22.80	69.40	10	5	50.0	275	167	60.7	16.98	25.59	2.50	3.45	86.5
PMPHEN	PHENOL	ug/L	2	18.40	21.10	10	2	20.0	275	118	42.9	9.10	14.52	1.50	2.46	78.4
PESTICIDES,HERBICIDES,PCBS																
P524D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	0.09	0.68	10	10	100.0	276	214	77.5	0.27	0.13	2.22	3.72	100.0
P1BHCG	GAMMA-BHC(HEXCHLORCYCLOHEXANE)	ug/L	2	0.02	0.04	10	6	60.0	276	143	51.8	0.02	0.02	1.86	2.29	94.6
P1ENDS	ENDOSULFAN SULPHATE	ug/L	3	0.14	0.27	10	4	40.0	276	13	4.7	0.08	0.04	2.48	1.56	16.2
P1BHCB	BETA-BHC (HEXCHLORCYCLOHEXANE)	ug/L	1	0.02	0.04	10	2	20.0	276	32	11.6	0.01	0.01	1.60	1.66	35.1
P1MIRX	MIREX	ug/L	1	0.03	0.04	10	2	20.0	276	6	2.2	0.01	0.01	1.70	1.28	10.8
P35ILV	SILVEX	ug/L	3	0.10	0.10	10	2	20.0	276	28	10.1	0.06	0.06	1.34	1.68	40.5
P1PCBT	PCB, TOTAL	ug/L	2	0.10	0.10	10	1	10.0	276	42	15.2	0.09	0.06	4.04	2.31	46.0
P1PPDD	PP-DDD	ug/L	1	0.03	0.03	10	1	10.0	276	6	2.2	0.01	0.01	1.42	1.38	13.5
P1PPDE	PP-DDE	ug/L	1	5.80	5.80	10	1	10.0	276	15	5.4	0.02	0.01	7.48	1.74	24.3
P1PPDT	PP-DDT	ug/L	3	0.09	0.09	10	1	10.0	276	9	3.3	0.04	0.04	1.29	1.35	18.9
X2124	1,2,4-TRICHLOROBENZENE	ug/L	3	0.04	0.04	10	1	10.0	276	35	12.7	0.01	0.01	1.55	2.48	40.5
X2HCB	HEXACHLOROETHANE	ug/L	3	0.02	0.02	10	1	10.0	276	5	1.8	0.01	0.01	1.25	1.26	13.5
VOLATILES ORGANIC COMPOUNDS																
X1111T	1,1,1-TRICHLOROETHANE	ug/L	1	91.00	230.00	10	5	50.0	274	21	7.7	56.74	23.18	3.08	1.74	18.9
X1CHLO	CHLOROFORM	ug/L	1	47.00	112.00	10	3	30.0	274	28	10.2	30.27	23.90	2.02	1.75	32.4
X1DCLE	1,1-DICHLOROETHENE	ug/L	1	130.00	230.00	10	2	20.0	274	7	2.6	30.65	20.55	2.48	1.28	13.5
B2EBNZ	ETHYLBENZENE	ug/L	1	45.00	45.00	10	1	10.0	274	30	11.0	21.69	23.50	1.29	1.75	29.7
B2STYR	STYRENE	ug/L	1	58.00	58.00	10	1	10.0	274	9	3.3	22.25	21.40	1.40	1.39	10.8
X112CE	1,2-DICHLOROETHANE	ug/L	1	120.00	120.00	10	1	10.0	274	2	0.7	23.92	20.26	1.76	1.17	5.4
X112CP	1,2-DICHLOROPROPANE	ug/L	1	42.00	42.00	10	1	10.0	274	1	0.4	21.54	20.05	1.26	1.05	2.7
X1CTET	CARBON TETRACHLORIDE	ug/L	1	99.00	99.00	10	1	10.0	274	2	0.7	23.47	20.19	1.66	1.12	5.4

PLANT NAME : Cornwall
PLANT TYPE : Primary

SAMPLING TYPE : Final Effluent
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC COD	STD. FOR SURFACE WATER	STD. REF.	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET.	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																		
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0		-	18.00	112.00	10	10	100.0	40	40	100.0	59.28	48.40	1.75	2.05	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0		-	50.00	376.00	10	10	100.0	40	40	100.0	122.13	108.54	1.90	1.56	100.0
DOC	DISSOLVED ORGANIC CARBGN	mg/L	0		-	10.40	38.50	10	10	100.0	40	40	100.0	14.36	12.80	1.46	1.40	100.0
NNHTFR	AMMONIUM,TOTAL FILT.REAC.	mg/L	0		-	2.20	10.10	10	10	100.0	40	40	100.0	5.42	10.46	1.80	1.66	100.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0		-	8.30	15.30	10	10	100.0	40	40	100.0	11.36	15.36	1.28	1.30	100.0
PH	(-LOG(H+(CONCN))		0		-	6.75	7.04	10	10	100.0	40	40	100.0	6.89	6.88	1.01	1.03	100.0
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/L	0		-	0.75	2.55	11	11	100.0	34	34	100.0	1.26	1.34	1.55	1.96	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0		-	26.20	71.30	9	9	100.0	39	39	100.0	36.25	29.57	1.46	1.73	100.0
NNO2FR	NITRITE,FIL.T. REACT.	mg/L	0		-	0.15	0.53	10	4	40.0	40	4	10.0	0.02	0.00	9.11	4.03	14.3
NNOTFR	NITRATES,TOTAL FILT.REAC.	mg/L	0		-	0.90	1.55	10	4	40.0	40	4	10.0	0.12	0.05	6.88	3.16	14.3
PHNOL	PHENOLICS (4AAP)	mg/L	0	0.00	ONT-MOE	0.11	0.17	10	3	30.0	40	7	17.5	0.07	0.06	1.63	2.01	57.1
METALS																		
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	75.00	ONT-MOE	2000.00	4800.00	12	12	100.0	48	46	95.8	2920.00	550.00	1.43	3.45	100.0
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	0.20	ONT-MOE	0.03	0.08	8	8	100.0	39	38	97.4	0.04	0.05	1.40	2.42	100.0
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	3750.00	ONT-MOE	680.00	1030.00	12	12	100.0	48	47	97.9	880.00	304.90	1.13	2.83	100.0
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	30.00	ONT-MOE	30.00	40.00	12	12	100.0	48	48	100.0	30.00	69.80	1.15	3.04	100.0
CDUT	CADMIUM,UNFILT.TOTAL	ug/L	0	0.20	ONT-MOE	0.00	10.00	12	9	75.0	48	18	37.5	0.00	2.50	1.93	1.96	85.7
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	100.00	ONT-MOE	10.00	10.00	12	8	66.7	48	29	60.4	10.00	10.80	1.37	1.94	85.7
CUUT	COPPER,UNFILT.TOTAL	ug/L	0	5.00	ONT-MOE	10.00	10.00	2	1	50.0	8	7	87.5	10.00	18.20	1.00	1.85	100.0
COUT	COBALT,UNFILT.TOTAL	ug/L	0	5.00	NYS-STD	10.00	20.00	12	3	25.0	48	11	22.9	10.00	6.50	1.74	1.58	85.7
NIUT	NICKEL,UNFILT.TOTAL	ug/L	0	25.00	ONT-MOE	10.00	20.00	12	2	16.7	48	10	20.8	10.00	8.70	1.54	2.86	57.1
CCNFUR	CYANIDE-FREE,UNFILT.REAC.	ug/L	0	5.00	ONT-MOE	10.00	10.00	10	1	10.0	40	3	7.5	0.00	0.90	2.50	2.61	42.9
AGUT	SILVER,UNFILT.TOTAL	ug/L	0	0.10	ONT-MOE	10.00	10.00	12	1	8.3	48	8	16.7	10.00	6.40	1.63	1.61	57.1
MOUT	MOLYBDENUM,UNFILT.TOTAL	ug/L	0		-	10.00	10.00	12	1	8.3	48	11	22.9	10.00	6.60	1.22	1.66	71.4
PBUT	LEAD,UNFILT.TOTAL	ug/L	0	25.00	ONT-MOE	30.00	30.00	12	1	8.3	48	9	18.8	20.00	20.80	1.27	1.94	71.4
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																		
PMMCRS	M-CRESOL	ug/L	1		-	9.10	32.40	10	8	80.0	39	18	46.2	9.62	3.90	2.86	2.97	71.4
PNNAPH	NAPHTHALENE	ug/L	1	10.00	NYS-STD	2.20	2.60	10	3	30.0	39	5	12.8	1.30	1.13	1.54	1.42	42.9
PMPHEN	PHENOL	ug/L	2	1.00	ONT-MOE	3.40	6.40	10	2	20.0	39	5	12.8	1.88	1.78	1.65	1.60	42.9
PMBBP	BUTYLBENZYLPHTHALATE	ug/L	1	50.00	NYS-GUL	8.90	8.90	10	1	10.0	39	8	20.5	1.24	1.42	2.00	2.10	57.1
PESTICIDES,HERBICIDES,PCBS																		
P324D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	4.00	ONT-MOE	0.02	1.00	10	10	100.0	40	27	67.5	0.15	0.06	3.41	4.96	85.7
P1BHCG	GAMMA-BHC(HEXCHLORCYCLHEXANE)	ug/L	2	0.06	ONT-MOE	0.02	0.04	10	7	70.0	40	29	72.5	0.02	0.02	2.26	2.28	85.7
X2HCE	HEXACHLOROETHANE	ug/L	3		-	0.02	0.03	10	5	50.0	40	5	12.5	0.01	0.01	2.19	1.64	14.3
P1BHCB	BETA-BHC (HEXCHLORCYCLHEXANE)	ug/L	1	0.01	ONT-MOE	0.01	0.01	10	4	40.0	40	6	15.0	0.01	0.01	1.43	1.36	28.6
P245T	2,4,5-TRICLORPHENOXYACETIC ACID	ug/L	3		-	0.06	0.15	10	4	40.0	40	7	17.5	0.04	0.04	2.11	2.61	42.9
P1PCBT	PCB, TOTAL	ug/L	2	0.00	ONT-MOE	0.06	0.15	10	2	20.0	40	7	17.5	0.05	0.03	5.03	3.06	28.6
P3SILV	SILVEX	ug/L	3		-	0.06	0.10	10	2	20.0	40	9	22.5	0.03	0.03	1.64	2.19	57.1
P1END8	ENDOSULFAN SULPHATE	ug/L	3		-	0.14	0.14	10	1	10.0	40	1	2.5	0.02	0.02	1.85	1.36	14.3
P1HEPT	HEPTACHLOR	ug/L	3	0.00	ONT-MOE	0.02	0.02	10	1	10.0	40	1	2.5	0.01	0.01	1.55	1.25	14.3
P1MEX	MIREX	ug/L	1	0.00	ONT-MOE	0.04	0.04	10	1	10.0	40	1	2.5	0.01	0.01	1.93	1.39	14.3
P1PPDT	PP-DDT	ug/L	3	0.00	ONT-MOE	0.11	0.11	10	1	10.0	40	1	2.5	0.02	0.02	1.71	1.31	14.3
X1HCCP	HEXACHLOROCYCLOPENTADIENE	ug/L	3	0.07	NYS-STD	0.06	0.06	10	1	10.0	40	1	2.5	0.05	0.05	1.06	1.03	14.3
X2124	1,2,4-TRICHLOROBENZENE	ug/L	3	0.50	ONT-MOE	0.03	0.03	10	1	10.0	40	1	2.5	0.01	0.01	1.76	1.33	14.3

PLANT NAME : Cornwall
PLANT TYPE : Primary

SAMPLING TYPE : Final Effluent
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	STD. FOR SURFACE WATER	STD. REF.	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET.	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
VOLATILES ORGANIC COMPOUNDS																		
X1111T	1,1,1-TRICHLOROETHANE	ug/L	1	50.00	NYS-GUL	3.70	160.00	10	9	90.0	38	10	26.3	20.99	2.34	6.77	5.17	28.6
X1CTET	CARBON TETRACHLORIDE	ug/L	1	0.40	NYS-GUL	4.60	53.00	10	9	90.0	38	9	23.7	15.22	2.05	3.23	3.84	14.3
X1TETR	TETRACHLOROETHYLENE	ug/L	1	0.70	NYS-GUL	2.70	12.00	10	8	80.0	38	21	55.3	4.12	4.39	2.38	5.84	85.7
X1CHLO	CHLOROFORM	ug/L	1	0.20	NYS-STD	12.00	16.00	10	5	50.0	38	15	39.5	3.75	2.07	4.04	2.72	71.4
X1DCLE	1,1-DICHLOROETHENE	ug/L	1	0.07	NYS-GUL	70.00	110.00	10	3	30.0	38	3	7.9	3.87	1.43	8.86	3.44	14.3
B2OXYL	O-XYLENE	ug/L	1	100.00	ONT-MOE	2.70	3.00	10	2	20.0	38	13	34.2	1.23	1.94	1.56	3.05	85.7
B2MPXY	M-, AND P-XYLENES	ug/L	1	50.00	NYS-GUL	3.80	3.80	10	1	10.0	38	10	26.3	1.14	1.83	1.53	3.42	85.7
B2STYR	STYRENE	ug/L	1	15.00	ONT-MOE	15.00	15.00	10	1	10.0	38	1	2.6	1.89	1.59	2.07	1.45	14.3
X1TRIC	TRICHLOROETHYLENE	ug/L	1	3.00	NYS-GUL	23.00	23.00	10	1	10.0	38	7	18.4	1.37	1.71	2.70	3.60	42.9

PLANT NAME : Cornwall
PLANT TYPE : Primary

SAMPLING TYPE : Raw Sludge
SAMPLE FORM : Dry Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
COD	CHEMICAL OXYGEN DEMAND	mg/kg	0	1085427.44	1208302.33	2	2	100.0	45	45	100.0	1150957.40	892221.45	1.07	3.19	100.0
NNHTPR	AMMONIUM,TOTAL, PR.T.REAC.	mg/kg	0	1097.42	2558.14	2	2	100.0	48	47	97.9	1675.51	5911.32	1.82	4.59	100.0
NNOTPR	NITRATES,TOTAL, PR.T.REAC.	mg/kg	0	5.96	9.51	2	2	100.0	48	43	89.6	7.53	25.44	1.39	2.21	93.9
NNTKUR	NITROGEN-TOT-KJEL,UNP.TOT	mg/kg	0	15805.17	27061.31	2	2	100.0	51	51	100.0	20681.12	34897.85	1.46	2.98	100.0
PH	(-1.00(0)+(CONCN))	mg/kg	0	5.95	5.97	2	2	100.0	49	49	100.0	5.96	6.03	1.00	1.10	100.0
PHNOL	PHENOLICS (4AAP)	mg/kg	0	59.20	238.57	2	2	100.0	50	41	82.0	118.84	82.34	2.68	3.54	85.3
PPUT	PHOSPHORUS,UNFIL.T.TOTAL.	mg/kg	0	12823.08	20359.41	2	2	100.0	42	42	100.0	16157.66	20347.70	1.39	4.43	100.0
RST	RESIDUE, TOTAL	mg/kg	0	47300.00	50300.00	2	2	100.0	51	51	100.0	48776.94	32783.51	1.04	1.81	100.0
RSTLOI	RESIDUE,TOT.LOSS ON IGNI.	mg/kg	0	30700.00	30800.00	2	2	100.0	51	51	100.0	30749.96	20803.05	1.00	1.77	100.0
METALS																
AGUT	SILVER,UNFIL.T.TOTAL.	mg/kg	0	11.73	15.22	2	2	100.0	45	40	88.9	13.36	30.17	1.20	2.61	84.4
ALUT	ALUMINUM,UNFIL.T.TOTAL.	mg/kg	0	57082.45	59642.15	2	2	100.0	51	51	100.0	58348.27	9835.74	1.05	2.51	100.0
ASUT	ARSENIC,UNFIL.T.TOTAL.	mg/kg	0	6.34	6.36	2	2	100.0	51	50	98.0	6.45	6.13	1.02	2.01	97.1
CDUT	CADMIUM,UNFIL.T.TOTAL.	mg/kg	0	1.37	1.99	2	2	100.0	43	40	93.0	1.65	9.74	1.30	4.35	90.0
CRUT	CHROMIUM,UNFIL.T.TOTAL.	mg/kg	0	52.85	53.68	2	2	100.0	51	50	98.0	53.26	301.43	1.01	3.68	97.1
CUUT	COPPER,UNFIL.T.TOTAL.	mg/kg	0	261.31	261.31	1	1	100.0	46	46	100.0	261.31	606.31	0.00	1.72	100.0
HGUT	MERCURY,UNFIL.T.TOTAL.	mg/kg	0	1.59	1.69	2	2	100.0	50	50	100.0	1.64	2.23	1.06	1.67	100.0
MOUT	MOLYBDENUM,UNFIL.T.TOTAL.	mg/kg	0	2.78	2.96	2	2	100.0	37	23	62.2	2.87	5.80	1.06	2.98	64.3
NIUT	NICKEL,UNFIL.T.TOTAL.	mg/kg	0	10.54	21.14	2	2	100.0	46	44	95.7	14.93	59.17	1.64	2.90	93.3
PBUT	LEAD,UNFIL.T.TOTAL.	mg/kg	0	88.79	149.11	2	2	100.0	49	48	98.0	115.06	173.99	1.44	2.24	96.9
SBUT	SELENIUM,UNFIL.T.TOTAL.	mg/kg	0	1.59	2.11	2	2	100.0	50	48	96.0	1.83	3.04	1.22	1.93	93.9
SRUT	STRONTIUM,UNFIL.T.TOTAL.	mg/kg	0	380.55	397.61	2	2	100.0	51	51	100.0	388.99	231.70	1.03	1.97	100.0
ZNUT	ZINC,UNFIL.T.TOTAL.	mg/kg	0	317.12	337.97	2	2	100.0	51	51	100.0	327.38	905.39	1.05	2.39	100.0
COUT	COBALT,UNFIL.T.TOTAL.	mg/kg	0	3.58	3.58	2	1	50.0	41	30	73.2	1.38	9.29	3.87	4.60	75.3
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PM4CRE	M-CRESOL	ug/kg	1	35785.30	194503.20	2	2	100.0	51	42	82.3	83428.70	116847.30	3.31	12.16	85.3
DIOXINS AND FURANS																
P94CDF	TETRACHLORODIBENZOFURAN	ug/kg	2	6.40	6.40	2	1	50.0	50	3	6.0	3.70	2.40	2.20	2.94	8.8
PESTICIDES,HERBICIDES,PCBS																
P1BHCB	BETA-BHC (HEXACHLORCYCLOHEX	ug/kg	1	8.00	38.10	2	2	100.0	51	18	35.3	17.50	7.40	3.02	3.29	38.2
P1BHCG	GAMMA-BHC(HEXACHLORCYCLOHEX	ug/kg	2	11.90	16.90	2	2	100.0	51	28	54.9	14.20	8.90	1.28	2.68	67.7
P1DIEL	DIELDRIN	ug/kg	2	6.00	12.70	2	2	100.0	51	20	39.2	8.70	7.20	1.70	3.10	50.0
P1DMDT	METHOXYCHLOR	ug/kg	1	59.60	63.40	2	2	100.0	51	19	37.3	61.50	45.80	1.04	5.15	44.1
P1PCBT	PCB, TOTAL	ug/kg	2	23.90	69.80	2	2	100.0	51	40	78.4	40.80	88.70	2.13	3.18	79.4
P1PPDE	PP DDE	ug/kg	1	4.00	4.20	2	2	100.0	51	22	43.1	4.10	7.30	1.04	2.31	52.9
P24D	2,4-DICHLOROPHENOXYACETIC	ug/kg	3	16.90	422.80	2	2	100.0	51	38	74.5	84.50	93.20	9.74	6.50	82.3
X2124	1,2,4-TRICHLOROBENZENE	ug/kg	3	10.60	11.90	2	2	100.0	51	17	33.3	11.20	9.30	1.08	4.06	41.2
P1BHCA	ALPHA-BHC(HEXACHLORCYCLOHEX	ug/kg	1	21.10	21.10	2	1	50.0	51	12	23.5	6.50	5.50	5.29	2.74	35.3
P1END2	ENDOSULFAN II	ug/kg	3	13.90	13.90	2	1	50.0	51	6	11.8	5.40	4.20	3.81	2.38	17.7
P1ENDS	ENDOSULFAN SULPHATE	ug/kg	3	516.90	516.90	2	1	50.0	51	6	11.8	66.30	18.60	18.26	2.80	17.7

PLANT NAME : Cornwall
PLANT TYPE : Primary

SAMPLING TYPE : Raw Sludge
SAMPLE FORM : Dry Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
P11EPE	HEPTACHLOREPOXIDE	ug/g	2	9.90	9.90	2	1	50.0	51	12	23.5	4.60	5.00	2.90	2.82	12.4
P1PPDD	PP-DDD	ug/g	1	6.30	6.30	2	1	50.0	51	13	25.5	3.50	5.10	2.25	2.48	15.3
VOLATILES ORGANIC COMPOUNDS																
X1BDCM	BROMODICHLOROMETHANE	ug/g	1	1749.50	1749.50	2	1	50.0	51	1	2.0	1053.30	934.60	2.05	1.82	2.9
X1CHLO	CHLOROFORM (CHCL3)	ug/g	1	6765.30	6765.30	2	1	50.0	51	12	23.5	1640.10	1225.10	7.42	4.24	35.3

PLANT NAME : Cornwall
PLANT TYPE : Primary

SAMPLING TYPE : Treated Sludge
SAMPLE FORM : Dry Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
COD	CHEMICAL OXYGEN DEMAND	mg/kg	0	968888.89	968888.89	1	1	100.0	36	36	100.0	968888.89	509097.94	0.00	4.65	100.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/kg	0	22500.00	25800.00	2	2	100.0	49	49	100.0	24093.57	38494.12	1.10	1.77	100.0
PH	(-LOG(H+(CONCN))	mg/kg	0	7.10	7.20	2	2	100.0	47	47	100.0	7.15	7.17	1.01	1.09	100.0
PHENOL	PHENOLICS (4AAP)	mg/kg	0	25.33	66.08	2	2	100.0	49	41	83.7	40.91	43.05	1.97	3.14	87.9
PPUT	PHOSPHORUS,UNFIL.T.TOTAL	mg/kg	0	25119.99	45940.01	2	2	100.0	43	43	100.0	33970.76	76638.67	1.53	6.91	100.0
RST	RESIDUE, TOTAL	mg/kg	0	225000.00	227000.00	2	2	100.0	50	50	100.0	225997.79	80434.04	1.01	3.23	100.0
RSTLOI	RESIDUE,TOT.LOSS ON IGNI.	mg/kg	0	109187.00	117000.00	2	2	100.0	50	50	100.0	113026.01	43379.33	1.05	3.19	100.0
METALS																
AGUT	SILVER,UNFIL.T.TOTAL	mg/kg	0	13.74	22.04	2	2	100.0	44	44	100.0	17.41	37.78	1.40	2.33	100.0
ALUT	ALUMINUM,UNFIL.T.TOTAL	mg/kg	0	65462.56	79111.11	2	2	100.0	50	50	100.0	71963.99	10715.94	1.14	2.82	100.0
ASUT	ARSENIC,UNFIL.T.TOTAL	mg/kg	0	5.73	6.67	2	2	100.0	50	49	98.0	6.18	5.40	1.11	2.06	97.1
CDUT	CADMIUM,UNFIL.T.TOTAL	mg/kg	0	2.64	2.67	2	2	100.0	45	41	91.1	2.65	10.47	1.01	3.98	90.3
COUT	COBALT,UNFIL.T.TOTAL	mg/kg	0	8.00	8.00	1	1	100.0	39	32	82.1	8.00	9.14	0.00	2.75	85.7
CRUT	CHROMIUM,UNFIL.T.TOTAL	mg/kg	0	46.26	75.56	2	2	100.0	50	50	100.0	59.12	333.06	1.41	3.59	100.0
CUUT	COPPER,UNFIL.T.TOTAL	mg/kg	0	320.00	320.00	1	1	100.0	45	45	100.0	320.00	732.24	0.00	2.16	100.0
HGUT	MERCURY,UNFIL.T.TOTAL	mg/kg	0	2.53	3.83	2	2	100.0	50	49	98.0	3.12	3.24	1.34	2.04	97.1
NIUT	NICKEL,UNFIL.T.TOTAL	mg/kg	0	32.44	32.44	1	1	100.0	45	42	93.3	32.44	72.95	0.00	2.95	90.0
PBUT	LEAD,UNFIL.T.TOTAL	mg/kg	0	133.33	144.93	2	2	100.0	50	49	98.0	139.01	196.62	1.06	2.46	97.1
SEUT	SELENIUM,UNFIL.T.TOTAL	mg/kg	0	1.76	1.78	2	2	100.0	50	48	96.0	1.77	2.67	1.01	2.98	97.1
SRUT	STRONTIUM,UNFIL.T.TOTAL	mg/kg	0	343.61	457.78	2	2	100.0	50	50	100.0	396.61	240.93	1.22	2.54	100.0
ZNUT	ZINC,UNFIL.T.TOTAL	mg/kg	0	409.69	417.78	2	2	100.0	50	50	100.0	413.71	988.90	1.01	2.57	100.0
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PNPHEN	PHENANTHRENE	ug/kg	1	5333.30	7048.50	2	2	100.0	50	12	24.0	6131.20	2220.50	1.22	4.27	26.5
PNCHRY	CHRYSENE	ug/kg	1	4296.40	4296.40	2	1	50.0	50	4	8.0	1375.70	1475.50	5.01	3.39	11.8
PESTICIDES,HERBICIDES,PCBS																
P1PCBT	PCB, TOTAL	ug/kg	2	89.60	207.60	2	2	100.0	50	32	64.0	136.40	114.10	1.81	4.58	67.7
X2124	1,2,4-TRICHLOROBENZENE	ug/kg	3	26.80	120.00	2	2	100.0	50	22	44.0	56.70	14.80	2.89	5.02	52.9
P1BHCB	BETA-BHC (HEXACHLORCYCLHEX	ug/kg	1	17.50	17.50	2	1	50.0	50	19	38.0	8.70	8.80	2.63	4.39	47.1
P1CHLA	ALPHA-CHLORDANE	ug/kg	1	20.50	20.50	2	1	50.0	50	22	44.0	9.50	6.50	2.97	2.41	55.9
P1CHLG	GAMMA-CHLORDANE	ug/kg	1	26.00	26.00	2	1	50.0	50	21	42.0	10.70	6.80	3.51	2.58	52.9
P1DIEL	DIELDRIN	ug/kg	2	10.30	10.30	2	1	50.0	50	15	30.0	6.70	6.50	1.82	3.51	38.2
P1DMDT	METHOXYCHLOR	ug/kg	1	74.90	74.90	2	1	50.0	50	15	30.0	40.60	34.10	2.38	4.42	38.2
P1ENDS	ENDOSULFAN SULPHATE	ug/kg	3	71.40	71.40	2	1	50.0	50	6	12.0	35.60	17.50	2.67	2.53	17.7
P1HEPE	HEPTACHLOREPOXIDE	ug/kg	2	11.80	11.80	2	1	50.0	50	10	20.0	7.20	5.20	2.01	2.86	23.5
P1PPDD	PP-DDD	ug/kg	1	33.00	33.00	2	1	50.0	50	7	14.0	12.00	4.60	4.16	2.47	20.6
P1PPDE	PP-DDE	ug/kg	1	23.90	23.90	2	1	50.0	50	34	68.0	10.30	11.10	3.31	2.72	73.5
X1HCCP	HEXACHLOROCYCLOPENTADIENE	ug/kg	3	86.90	86.90	2	1	50.0	50	8	16.0	43.90	34.20	2.62	2.76	23.5
VOLATILE ORGANIC COMPOUNDS																
B2ETBNZ	ETHYL BENZENE (C8H10)	ug/kg	1	1155.60	1155.60	2	1	50.0	50	14	28.0	319.10	606.50	6.17	5.59	32.4
X1CHLO	CHLOROFORM (CHCL3)	ug/kg	1	297.80	297.80	2	1	50.0	50	12	24.0	162.00	441.70	2.37	4.33	35.3

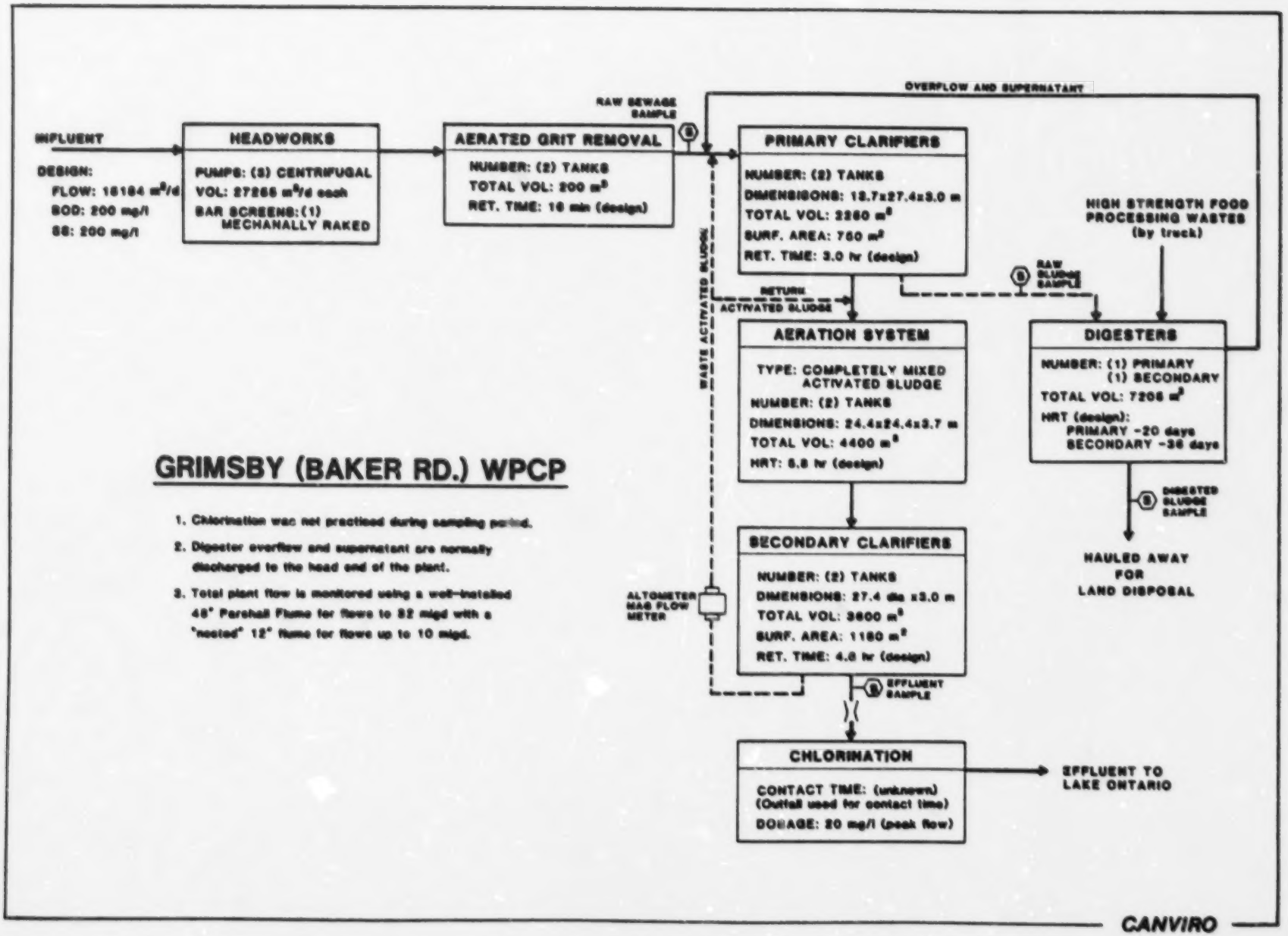
Sub-Appendix A-5

Grimsby (Baker Road) WPCP

Contents:

- Plant Schematic with Design Characteristics
- Annual Data Review (1981 - 1986 Plant Performance)
- Sources of Municipal Water Pollution Control Plant Raw Sewage
- Operational Evaluation for Grimsby (Baker Road) WPCP
- Analytical Data

(KIR18/28A)



GRIMSBY (BAKER RD.) WPCP

1. Chlorination was not practised during sampling period.
2. Digester overflow and supernatant are normally discharged to the head end of the plant.
3. Total plant flow is monitored using a well-installed 48" Parshall Flume for flows to 32 mgd with a "nested" 12" flume for flows up to 10 mgd.

CANVIRO

Annual Data Review | GRIMSBY | L. Ontario

BAKER ROAD WPCP
Conventional Activated Sludge
Phosphorus Removal - Continuous
Capacity - 18.184 10(3)m3/day

PARAMETER	1981	1982	1983	1984	1985	MEAN ANNUAL AVERAGE
Avg. Daily Flow (1000 m3/day)	8.89	10.58	10.71	10.75	11.98	10.57
BOD5 - Influent (mg/L)	102.60	90.00	81.20	101.04	115.42	96.85
BOD5 - Effluent (mg/L)	11.40	7.00	5.99	6.40	11.74	8.51
Annual BOD5 Significantly Different from Mean Annual Average BOD5?	I.D.	I.D.	I.D.	I.D.	I.D.	
TSS - Influent (mg/L)	167.70	169.00	166.60	165.52	148.67	161.90
TSS - Effluent (mg/L)	8.40	8.00	5.20	6.89	7.19	7.14
Annual TSS Significantly Different from Mean Annual Average TSS?	I.D.	I.D.	I.D.	I.D.	I.D.	
Total P - Influent (mg/L)	6.10	4.90	5.30	5.11	5.46	5.39
Total P - Effluent (mg/L)	0.49	0.00	0.06	0.72	0.60	0.69
Annual TP Significantly Different from Mean Annual Average TP?	I.D.	I.D.	I.D.	I.D.	I.D.	
TP in Compliance?	Y	Y	Y	Y	Y	Y

I.D. - Insufficient Data

R

SOURCES OF MUNICIPAL WATER POLLUTION CONTROL PLANT RAW SEWAGE

GENERAL DESCRIPTION OF WATER POLLUTION CONTROL PLANT (WPCP)

NAME OF WPCP	BAKER ROAD WPCP
WORKS NUMBER	120001684
TREATMENT TYPE	CONVENTIONAL ACTIVATED SLUDGE PHOSPHORUS REMOVAL CONTINUOUS
DESIGN CAPACITY (1000 m3/d)	18.184
1986 AVERAGE DAY FLOW (1000 m3/d)	12.594
POPULATION SERVED	19850

% OF TOTAL FLOW ATTRIBUTED TO:

INDUSTRIAL SOURCES (%)	0
COMMERCIAL SOURCES (%) (Population x 0.0757)	12
RESIDENTIAL SOURCES (%) (Population x 0.175)	28
UNACCOUNTED FOR, INCL. INFILTRATION (100-% Contributed from industrial, commercial and residential sources)	60

PROFILE OF INDUSTRIES IN CATCHMENT

TOTAL NO OF INDUSTRIES	1
INDUSTRIES WITH WATER	0
NO OF SIC CATEGORIES	1

DESCRIPTION OF THE TOP 5 INDUSTRIES DISCHARGED TO THE WPCP (BASED ON WATER USE DATA)

DESCRIPTION	SIC	# OF COMPANIES

OPERATIONAL EVALUATION FOR: GRIMSBY (BAKER ROAD) WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: April 24, 1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 18,184 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
RAW SEWAGE FLOW	37,055	39,869	25,685	20,139	7,593	16,320	15,911
% of Design Flow	203.78%	219.25%	141.25%	110.75%	41.76%	89.75%	87.50%
Influent BOD (mg/L)	31.0				38.0		
Primary BOD (mg/L)	85.0				49.0		
Secondary BOD (mg/L)	7.0				6.0		
% PRIMARY REMOVAL	-174.2%				-28.9%		
% SECONDARY REMOVAL	77.4%				84.2%		
Influent SS (mg/L)	60.0	60.0	50.0	72.0	180.0	58.0	60.0
Primary SS (mg/L)	210.0	88.0	134.0	130.0	66.0	58.0	76.0
Secondary SS (mg/L)	20.0	24.0	23.0	19.0	10.0	11.0	18.0
% PRIMARY REMOVAL	-250.0%	-46.7%	-168.0%	-80.6%	63.3%	0.0	-26.7%
% SECONDARY REMOVAL	66.7%	60.0%	54.0%	73.6%	94.4%	81.0%	70.0%
Influent NH4 (mg/L)	3.2				6.1		
Primary NH4 (mg/L)	4.6				8.3		
Secondary NH4 (mg/L)	0.5				0.2		
% PRIMARY REMOVAL	-43.7%				-36.1%		
% SECONDARY REMOVAL	84.4%				96.7%		
Influent TKN (mg/L)	6.1				10.7		
Primary TKN (mg/L)	14.5				12.1		
Secondary TKN (mg/L)	1.4				1.2		
% PRIMARY REMOVAL	-137.7%				-13.1%		
% SECONDARY REMOVAL	77.0%				88.8%		
Influent Total P (mg/L)	1.80				4.50		
Primary Total P (mg/L)	6.30				3.50		
Secondary Total P (mg/L)	0.70				0.30		
% PRIMARY REMOVAL	-250.0%				22.2%		
% SECONDARY REMOVAL	61.1%				93.3%		

OPERATIONAL EVALUATION FOR: GRIMSBY (BAKER ROAD) WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: April 24, 1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 18,184 m3/d

PARAMETER	PRE-SAMPLING PERIOD						
	DAY 8	DAY 9	DAY 10	DAY 11	DAY 12	DAY 13	DAY 14
RAW SEWAGE FLOW	22,950	16,457	15,320	15,275	14,684	13,456	13,034
% of Design Flow	126.21%	90.50%	84.25%	84.00%	80.75%	74.00%	71.68%
Influent BOD (mg/L)	47.0			52.0			
Primary BOD (mg/L)	49.0			60.0			
Secondary BOD (mg/L)	32.0			17.0			
% PRIMARY REMOVAL	-4.3%			-15.4%			
% SECONDARY REMOVAL	31.9%			67.3%			
Influent SS (mg/L)	148.0	100.0	89.0	139.0	188.0	330.0	130.0
Primary SS (mg/L)	81.0	89.0	96.0	100.0	101.0	64.0	44.0
Secondary SS (mg/L)	19.0	5.0	6.0	8.0	11.0	17.0	12.0
% PRIMARY REMOVAL	45.3%	11.0%	-7.9%	28.1%	46.3%	80.6%	66.2%
% SECONDARY REMOVAL	87.2%	95.0%	93.3%	94.2%	94.1%	94.8%	90.8%
Influent NH4 (mg/L)	7.1			8.0			
Primary NH4 (mg/L)	6.3			11.9			
Secondary NH4 (mg/L)	15.4			2.9			
% PRIMARY REMOVAL	11.3%			-48.7%			
% SECONDARY REMOVAL	-116.9%			63.7%			
Influent TKN (mg/L)	12.1			13.5			
Primary TKN (mg/L)	11.3			17.3			
Secondary TKN (mg/L)	20.4			4.4			
% PRIMARY REMOVAL	6.6%			-28.1%			
% SECONDARY REMOVAL	-68.6%			67.4%			
Influent Total P (mg/L)	3.60			4.00			
Primary Total P (mg/L)	2.80			3.80			
Secondary Total P (mg/L)	0.60			0.20			
% PRIMARY REMOVAL	22.2%			5.0%			
% SECONDARY REMOVAL	83.3%			95.0%			

OPERATIONAL EVALUATION FOR: GRIMSBY (BAKER ROAD) WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: April 24, 1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 18,184 m3/d

PARAMETER	SAMPLING PERIOD DAY 15	DAY 16	DAY 17	DAY 18	DAY 19	DAY 20	DAY 21
RAW SEWAGE FLOW	12,638	12,919	12,502	12,138	11,684		
% of Design Flow	69.50%	71.05%	68.75%	66.75%	64.25%		
Influent BOD (mg/L)							
Primary BOD (mg/L)							
Secondary BOD (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent SS (mg/L)	410.0	174.0	120.0	148.0	194.0		
Primary SS (mg/L)	44.0	52.0	40.0	52.0	40.0		
Secondary SS (mg/L)	4.0	9.0	8.0	6.0	7.0		
% PRIMARY REMOVAL	89.3%	70.1%	66.7%	64.9%	79.4%		
% SECONDARY REMOVAL	99.0%	94.8%	93.3%	95.9%	96.4%		
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)							
Primary Total P (mg/L)							
Secondary Total P (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							

PLANT NAME : Grimsby (Baker Road) **SAMPLING TYPE : Raw Sewage**
PLANT TYPE : Secondary **SAMPLE FORM : Wet Weight**

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	PLANT MIN. CONC. > MDL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0	56.60	265.00	5	5	100.0	267	266	99.6	144.11	140.23	1.78	1.93	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0	196.00	298.00	5	5	100.0	260	258	99.2	245.13	287.75	1.19	1.82	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0	14.10	20.00	5	5	100.0	271	271	100.0	16.16	22.39	1.15	1.81	100.0
NNHTPR	AMMONIUM,TOTAL FLT.REAC.	mg/L	0	12.20	14.60	5	5	100.0	275	274	99.6	13.23	15.37	1.08	1.69	100.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0	21.80	26.00	5	5	100.0	273	273	100.0	23.74	25.44	1.07	1.47	100.0
PH	(-LOG(H+(CONCN))		0	7.16	7.36	5	5	100.0	275	275	100.0	7.27	6.90	1.01	1.05	100.0
PPUT	PHOSPHORUS,UNFLT.TOTAL	mg/L	0	5.08	5.90	5	5	100.0	268	268	100.0	5.41	5.18	1.06	1.31	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0	78.30	138.00	5	5	100.0	267	266	99.6	102.34	126.88	1.24	1.93	100.0
METALS																
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	150.00	770.00	5	5	100.0	322	306	95.0	360.00	1000.10	1.98	2.65	97.3
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	0.21	0.36	5	5	100.0	283	274	96.8	0.24	0.23	1.27	2.11	100.0
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	210.00	790.00	5	5	100.0	319	318	99.7	430.00	370.70	2.01	2.14	100.0
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	100.00	780.00	5	5	100.0	322	315	97.8	270.00	211.00	2.30	2.94	100.0
CDUT	CADMIUM,UNFILT.TOTAL	ug/L	0	0.00	0.00	5	2	40.0	322	76	23.6	0.00	6.50	1.25	2.09	70.3
COUT	COBALT,UNFILT.TOTAL	ug/L	0	20.00	70.00	5	2	40.0	322	82	25.5	10.00	9.30	3.28	2.31	83.8
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	10.00	10.00	5	1	20.0	322	237	73.6	10.00	51.10	1.36	3.44	89.2
PBUT	LEAD,UNFILT.TOTAL	ug/L	0	110.00	110.00	5	1	20.0	322	57	17.7	40.00	59.50	2.38	1.86	51.4
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PMMCRE	M-CRESOL	ug/L	1	51.40	51.40	5	2	40.0	275	1e7	60.7	16.20	25.59	2.87	3.45	86.5
PMPHEN	PHENOL	ug/L	2	27.60	27.70	5	2	40.0	275	118	42.9	12.64	14.52	2.04	2.46	78.4
PNPYR	PYRENE	ug/L	1	15.00	15.00	5	1	20.0	275	1	0.4	8.62	7.51	1.36	1.26	2.7
PESTICIDES,HERBICIDES,PCBS																
P1DMDT	METHOXYCHLOR	ug/L	1	1.40	2.90	5	5	100.0	276	47	17.0	1.79	0.08	1.34	3.14	43.2
P324D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	5	0.02	0.72	5	5	100.0	276	214	77.5	0.26	0.13	4.52	3.72	100.0
P1BHCB	BETA-BHC (HEXACHLORCYCLOHEXANE)	ug/L	1	0.03	0.04	5	3	60.0	276	32	11.6	0.02	0.01	1.94	1.66	35.1
P1BHCG	GAMMA-BHC(HEXACHLORCYCLOHEXANE)	ug/L	2	0.03	0.03	5	1	20.0	276	143	51.8	0.01	0.02	1.63	2.29	94.6
X2126	1,2,4-TRICHLOROBENZENE	ug/L	5	0.02	0.02	5	1	20.0	276	35	12.7	0.01	0.01	1.36	2.48	40.5

PLANT NAME : Grimsby (Baker Road)
PLANT TYPE : Secondary

SAMPLING TYPE : Final Effluent
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	STD. FOR SURFACE WATER	STD. REF.	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET.	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																		
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0		-	11.90	32.00	5	5	100.0	213	211	99.1	18.90	21.22	1.55	2.07	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0		-	20.00	34.00	5	5	100.0	213	211	99.1	26.49	52.80	1.30	1.83	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0		-	5.00	7.00	5	5	100.0	220	220	100.0	5.96	8.09	1.13	1.60	100.0
NNHTPR	AMMONIUM,TOTAL FIL.T.REAC.	mg/L	0		-	5.75	11.50	5	5	100.0	223	204	91.5	7.80	3.90	1.31	6.98	100.0
NNO2PR	NITRITE,FIL.T. REACT.	mg/L	0		-	0.20	0.40	5	5	100.0	220	194	88.2	0.26	0.22	1.41	5.95	96.4
NNOTPR	NITRATES,TOTAL FIL.T.REAC.	mg/L	0		-	5.05	6.40	5	5	100.0	224	186	83.0	5.72	2.33	1.11	7.75	96.4
NNTEUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0		-	7.50	14.60	5	5	100.0	222	222	100.0	10.36	7.97	1.28	2.71	100.0
PH	(-LOG([H+](CONCN))		0		-	7.45	7.73	5	5	100.0	224	224	100.0	7.58	7.10	1.02	1.05	100.0
PPUT	PHOSPHORUS,UNFIL.T.TOTAL	mg/L	0		-	0.20	0.87	6	6	100.0	211	206	97.6	0.40	0.68	1.49	1.97	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0		-	9.50	14.20	5	5	100.0	220	219	99.6	10.76	10.12	1.17	2.00	100.0
METALS																		
HGUT	MERCURY,UNFIL.T.TOTAL	ug/L	0	0.50	ONT-MOE	0.01	0.02	5	5	100.0	233	220	94.4	0.01	0.03	1.46	2.62	100.0
SRUT	STRONTIUM,UNFIL.T.TOTAL	ug/L	0	5750.00	ONT-MOE	530.00	820.00	6	6	100.0	267	267	100.0	720.00	340.90	1.18	2.14	100.0
ZNUT	ZINC,UNFIL.T.TOTAL	ug/L	0	30.00	ONT-MOE	20.00	60.00	6	6	100.0	267	262	98.1	40.00	33.30	1.50	2.48	100.0
ALUT	ALUMINUM,UNFIL.T.TOTAL	ug/L	0	75.00	ONT-MOE	40.00	90.00	6	4	66.7	264	196	74.2	50.00	101.70	1.74	3.72	96.4
CDUT	CADMIUM,UNFIL.T.TOTAL	ug/L	0	0.20	ONT-MOE	0.00	0.00	6	2	33.3	267	65	24.3	0.00	2.10	1.79	2.07	71.4
PESTICIDES,HERBICIDES,PCBS																		
PIDMDT	METHOXYCHLOR	ug/L	1	0.04	ONT-MOE	0.20	0.80	4	4	100.0	227	31	13.7	0.31	0.04	1.92	2.72	35.7
P324D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	4.00	ONT-MOE	0.07	0.20	4	4	100.0	227	177	78.0	0.14	0.08	1.58	4.71	100.0
PITOX	TOXAPHENE	ug/L	0	0.01	ONT-MOE	0.04	0.04	4	1	25.0	227	3	1.3	0.02	0.02	1.41	1.13	7.1

PLANT NAME : Grimsby (Baker Rd.)
PLANT TYPE : Secondary

SAMPLING TYPE : Raw Sludge
SAMPLE FORM : Dry Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
COD	CHEMICAL OXYGEN DEMAND	mg/kg	0	794912.56	794912.56	1	1	100.0	45	45	100.0	794912.56	892221.45	0.00	3.19	100.0
NNHTPR	AMMONIUM,TOTAL FIL.T.REAC.	mg/kg	0	5182.83	5182.83	1	1	100.0	48	47	97.9	5182.83	5911.32	0.00	4.59	100.0
NNOTPR	NITRATES,TOTAL FIL.T.REAC.	mg/kg	0	21.46	21.46	1	1	100.0	48	43	89.6	21.46	25.44	0.00	2.21	93.9
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/kg	0	35771.07	35771.07	1	1	100.0	51	51	100.0	35771.07	36897.85	0.00	2.98	100.0
PH	(-LOG(H+(CONCN))	mg/kg	0	6.72	6.72	1	1	100.0	49	49	100.0	6.72	6.03	0.00	1.10	100.0
PHNOL	PHENOLICS (4AAP)	mg/kg	0	100.16	100.16	1	1	100.0	50	41	82.0	100.16	82.34	0.00	3.54	85.3
PPUT	PHOSPHORUS,UNFIL.T.TOTAL	mg/kg	0	39427.66	39427.66	1	1	100.0	42	42	100.0	39427.66	20347.70	0.00	4.43	100.0
RST	RESIDUE, TOTAL	mg/kg	0	62900.00	62900.00	1	1	100.0	51	51	100.0	62900.00	32783.51	0.00	1.81	100.0
RSTLOI	RESIDUE,TOT.LOSS ON IGNI.	mg/kg	0	32300.00	32300.00	1	1	100.0	51	51	100.0	32300.00	20803.05	0.00	1.77	100.0
METALS																
AGUT	SILVER,UNFIL.T.TOTAL	mg/kg	0	19.71	19.71	1	1	100.0	45	40	88.9	19.71	30.17	0.00	2.61	84.4
ALUT	ALUMINUM,UNFIL.T.TOTAL	mg/kg	0	6359.30	6359.30	1	1	100.0	51	51	100.0	6359.30	9835.74	0.00	2.51	100.0
ASUT	ARSENIC,UNFIL.T.TOTAL	mg/kg	0	6.68	6.68	1	1	100.0	51	50	98.0	6.68	6.13	0.00	2.01	97.1
CRUT	CHROMIUM,UNFIL.T.TOTAL	mg/kg	0	174.88	174.88	1	1	100.0	51	50	98.0	174.88	301.43	0.00	3.68	97.1
HGUT	MERCURY,UNFIL.T.TOTAL	mg/kg	0	3.50	3.50	1	1	100.0	50	50	100.0	3.50	2.23	0.00	1.67	100.0
PBUT	LEAD,UNFIL.T.TOTAL	mg/kg	0	174.88	174.88	1	1	100.0	49	48	98.0	174.88	173.99	0.00	2.24	96.9
SEUT	SELENIUM,UNFIL.T.TOTAL	mg/kg	0	12.72	12.72	1	1	100.0	50	48	96.0	12.72	3.04	0.00	1.93	93.9
SRUT	STRONTIUM,UNFIL.T.TOTAL	mg/kg	0	365.66	365.66	1	1	100.0	51	51	100.0	365.66	231.70	0.00	1.97	100.0
ZNUT	ZINC,UNFIL.T.TOTAL	mg/kg	0	2066.77	2066.77	1	1	100.0	51	51	100.0	2066.77	905.39	0.00	2.39	100.0
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
P96MCRE	M-CRESOL	ug/kg	1	453100.20	453100.20	1	1	100.0	51	42	82.3	453100.20	116847.30	0.00	12.16	85.3
DIOXINS AND FURANS																
P98CDF	OCTACHLORODIBENZOFURAN	ug/kg	1	4.00	4.00	1	1	100.0	50	4	8.0	4.00	5.40	0.00	3.48	11.8
PESTICIDES,HERBICIDES,PCBS																
P1BHCB	BETA-BHC (HEXACHLORCYCLOHEXANE)	ug/kg	1	62.00	62.00	1	1	100.0	51	18	35.3	62.00	7.40	0.00	3.29	38.2
P1CHLA	ALPHA-CHLORDANE	ug/kg	1	4.80	4.80	1	1	100.0	51	18	35.3	4.80	5.90	0.00	2.38	47.1
P1CHLG	GAMMA-CHLORDANE	ug/kg	1	4.80	4.80	1	1	100.0	51	19	37.3	4.80	6.00	0.00	2.46	50.0
P1DIEL	DIELDRIN	ug/kg	2	9.50	9.50	1	1	100.0	51	20	39.2	9.50	7.20	0.00	3.10	50.0
P1DMDT	METHOXYCHLOR	ug/kg	1	3179.70	3179.70	1	1	100.0	51	19	37.3	3179.70	45.80	0.00	5.15	44.1
P1ENS1	ENDOSULFAN I	ug/kg	3	4.80	4.80	1	1	100.0	51	9	17.7	4.80	4.60	0.00	2.56	20.6
P1ENS2	ENDOSULFAN II	ug/kg	3	4.80	4.80	1	1	100.0	51	6	11.8	4.80	4.20	0.00	2.38	17.7
P1ENSR	ENDRIN	ug/kg	3	3.20	3.20	1	1	100.0	51	8	15.7	3.20	4.20	0.00	2.21	23.5
P1HEPR	HEPTACHLOR EPOXIDE	ug/kg	2	9.50	9.50	1	1	100.0	51	12	23.5	9.50	5.00	0.00	2.62	32.4
P1PCBT	PCB, TOTAL	ug/kg	2	92.20	92.20	1	1	100.0	51	40	78.4	92.20	88.70	0.00	3.18	79.4
P1PPDD	PP DDD	ug/kg	1	4.80	4.80	1	1	100.0	51	13	25.5	4.80	5.10	0.00	2.48	35.3
P1PPDE	PP-DDE	ug/kg	1	19.10	19.10	1	1	100.0	51	22	43.1	19.10	7.50	0.00	2.31	52.9
P24D	2,4-DICHLOROPHENOXYACETIC	ug/kg	3	109.70	109.70	1	1	100.0	51	38	74.5	109.70	93.20	0.00	6.50	82.3
X2HCB	HEXACHLOROBENZENE	ug/kg	2	3.20	3.20	1	1	100.0	51	17	33.3	3.20	5.60	0.00	2.65	38.2

PLANT NAME : Grimsby (Baker Rd.)
PLANT TYPE : Secondary

SAMPLING TYPE : Treated Sludge
SAMPLE FORM : Dry Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QA/QC CODE	PLANT (DRY WEIGHT) MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
COD	CHEMICAL OXYGEN DEMAND	mg/kg	0	754601.23	754601.23	1	1	100.0	36	36	100.0	754601.23	508097.94	0.00	4.65	100.0
NNHTPR	AMMONIUM,TOTAL FILT.REAC.	mg/kg	0	13987.73	13987.73	1	1	100.0	25	25	100.0	13987.73	17658.28	0.00	2.92	100.0
NNOTPR	NITRATES,TOTAL FILT.REAC.	mg/kg	0	58.28	58.28	1	1	100.0	26	23	88.5	58.28	42.68	0.00	2.29	95.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/kg	0	42944.79	42944.79	1	1	100.0	49	49	100.0	42944.79	38494.12	0.00	1.77	100.0
PH	(-LOG(H+(CONCN))	mg/kg	0	7.49	7.49	1	1	100.0	47	47	100.0	7.49	7.17	0.00	1.09	100.0
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/kg	0	32924.34	32924.34	1	1	100.0	43	43	100.0	32924.34	76638.67	0.00	6.91	100.0
RST	RESIDUE, TOTAL	mg/kg	0	48900.00	48900.00	1	1	100.0	50	50	100.0	48900.00	80434.04	0.00	3.23	100.0
RSTLOI	RESIDUE,TOT.LOSS ON IGNI.	mg/kg	0	22300.00	22300.00	1	1	100.0	50	50	100.0	22300.00	43379.33	0.00	3.19	100.0
METALS																
AGUT	SILVER,UNFILT.TOTAL	mg/kg	0	27.61	27.61	1	1	100.0	44	44	100.0	27.61	37.78	0.00	2.33	100.0
ALUT	ALUMINUM,UNFILT.TOTAL	mg/kg	0	9406.95	9406.95	1	1	100.0	50	50	100.0	9406.95	10715.94	0.00	2.82	100.0
ASUT	ARSENIC,UNFILT.TOTAL	mg/kg	0	8.18	8.18	1	1	100.0	50	49	98.0	8.18	5.40	0.00	2.08	97.1
CRUT	CHROMIUM,UNFILT.TOTAL	mg/kg	0	265.85	265.85	1	1	100.0	50	50	100.0	265.85	333.06	0.00	3.39	100.0
HGUT	MERCURY,UNFILT.TOTAL	mg/kg	0	3.68	3.68	1	1	100.0	50	49	98.0	3.68	3.24	0.00	2.04	97.1
PBUT	LEAD,UNFILT.TOTAL	mg/kg	0	147.24	147.24	1	1	100.0	50	49	98.0	147.24	196.62	0.00	2.46	97.1
SBUT	SELENIUM,UNFILT.TOTAL	mg/kg	0	22.49	22.49	1	1	100.0	50	48	96.0	22.49	2.67	0.00	2.98	97.1
SRUT	STRONTIUM,UNFILT.TOTAL	mg/kg	0	470.35	470.35	1	1	100.0	50	50	100.0	470.35	260.93	0.00	2.54	100.0
ZNUT	ZINC,UNFILT.TOTAL	mg/kg	0	2249.49	2249.49	1	1	100.0	50	50	100.0	2249.49	988.90	0.00	2.57	100.0
PESTICIDES,HERBICIDES,PCBS																
P1BHCA	ALPHA-BHC(HEXCHLORCYCLHEXANE)	ug/kg	1	5.10	5.10	1	1	100.0	50	11	22.0	5.10	5.60	0.00	3.00	32.4
P1BHCB	BETA-BHC (HEXCHLORCYCLHEXANE)	ug/kg	1	57.30	57.30	1	1	100.0	50	19	38.0	57.30	8.80	0.00	4.39	47.1
P1DMDT	METHOXYCHLOR	ug/kg	1	4090.00	4090.00	1	1	100.0	50	15	30.0	4090.00	34.10	0.00	4.42	38.2
P1PCBT	PCB, TOTAL	ug/kg	2	104.30	104.30	1	1	100.0	50	32	64.0	104.30	114.10	0.00	4.58	67.7
P1PPDE	PP-DDE	ug/kg	1	22.50	22.50	1	1	100.0	50	34	68.0	22.50	11.10	0.00	2.72	73.5
P3245T	2,4,5-TRICLORPHENOXYACETIC ACID	ug/kg	3	67.50	67.50	1	1	100.0	50	16	32.0	67.50	84.40	0.00	3.13	41.2
P324D	2,4-DICHLOROPHENOXYACETIC ACID	ug/kg	3	306.70	306.70	1	1	100.0	50	25	50.0	306.70	75.00	0.00	5.81	64.7
P3SILV	SILVEX	ug/kg	3	32.70	32.70	1	1	100.0	50	18	36.0	32.70	92.70	0.00	2.94	44.1
X2HCB	HEXACHLOROBENZENE	ug/kg	2	5.10	5.10	1	1	100.0	50	21	42.0	5.10	7.00	0.00	2.96	55.9

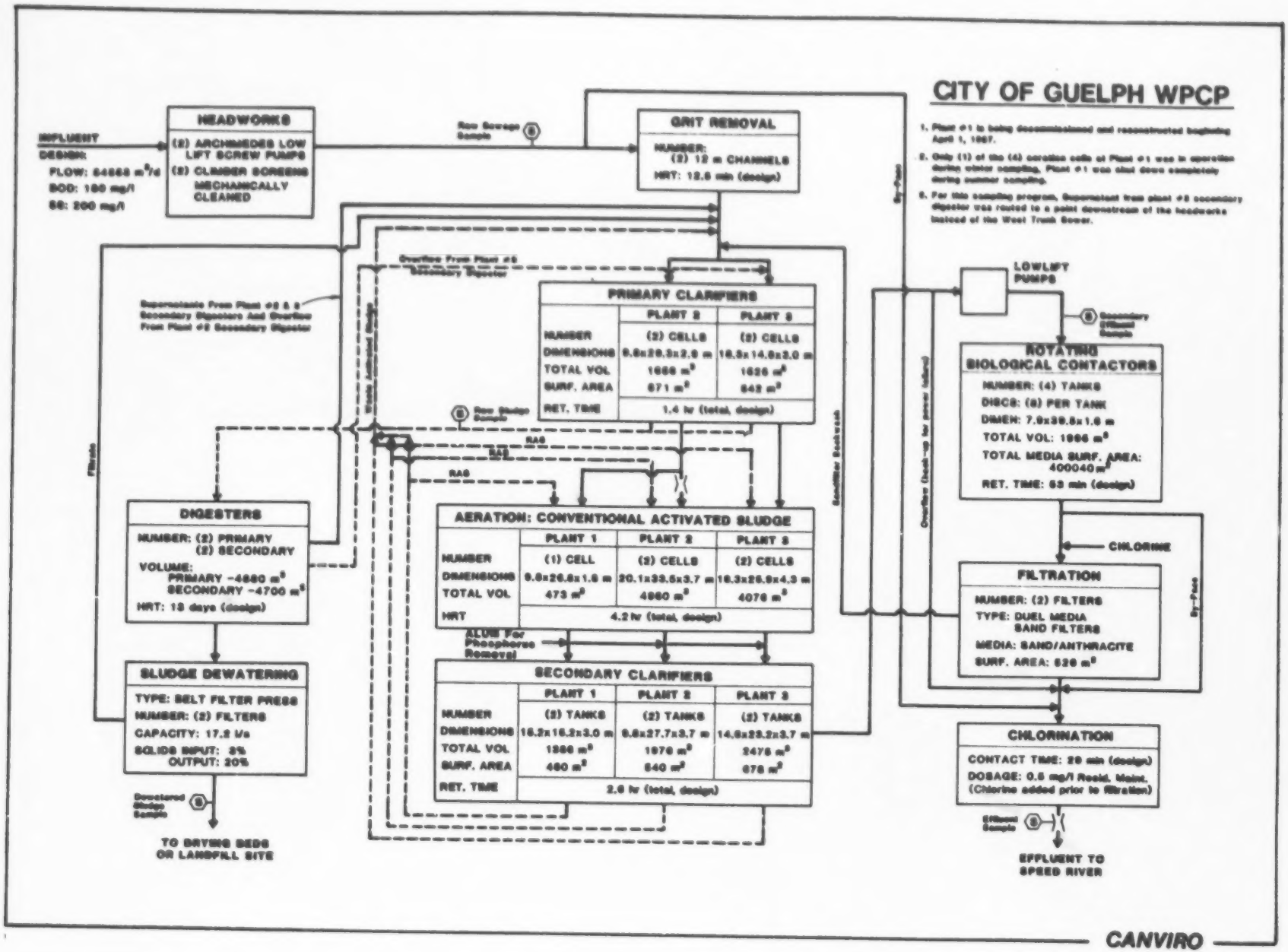
Sub-Appendix A-6

Guelph WPCP

Contents:

- Plant Schematic with Design Characteristics
- Annual Data Review (1981 - 1986 Plant Performance)
- Sources of Municipal Water Pollution Control Plant Raw Sewage
- Operational Evaluation for Guelph WPCP
- Analytical Data

(KIR18/28A)


CITY OF GUELPH WPCP
1. Plant #1 is being decommissioned and reconstructed beginning April 1, 1987.
2. Only (1) of the (4) aeration cells at Plant #1 was in operation during winter sampling. Plant #1 was shut down completely during summer sampling.
3. For this sampling program, Supernatant from plant #2 secondary digester was routed to a point downstream of the headworks instead of the West Trunk Sewer.
INFLUENT DESIGN:
FLOW: 64668 m³/d
BOD: 180 mg/l
SS: 200 mg/l
HEADWORKS
(2) ARCHIMEDES LOW LIFT SCREW PUMPS
(2) CLIMBER SCREENS MECHANICALLY CLEANED
Raw Sewage Sample
GRIT REMOVAL
NUMBER: (2) 12 m CHANNELS
HRT: 12.6 min (design)
By-Pass
Overflow From Plant #2 Secondary Digester
Supernatants From Plant #2 & 3 Secondary Digesters And Overflow From Plant #2 Secondary Digester
Waste Activated Sludge
PRIMARY CLARIFIERS
PLANT 2 | PLANT 3
NUMBER: (2) CELLS | (2) CELLS
DIMENSIONS: 6.6x29.3x2.9 m | 16.5x14.6x3.0 m
TOTAL VOL: 1668 m³ | 1626 m³
SURF. AREA: 671 m² | 642 m²
RET. TIME: 1.4 hr (total, design)
Raw Sludge Sample
RAS
RAS
RAS
Filtrate
DIGESTERS
NUMBER: (2) PRIMARY (2) SECONDARY
VOLUME: PRIMARY -4660 m³ SECONDARY -4700 m³
HRT: 18 days (design)
AERATION: CONVENTIONAL ACTIVATED SLUDGE
PLANT 1 | PLANT 2 | PLANT 3
NUMBER: (1) CELL | (2) CELLS | (2) CELLS
DIMENSIONS: 6.0x26.6x1.6 m | 20.1x33.5x3.7 m | 16.3x26.9x4.3 m
TOTAL VOL: 473 m³ | 4960 m³ | 4076 m³
HRT: 4.2 hr (total, design)
ALUM For Phosphorus Removal
SECONDARY CLARIFIERS
PLANT 1 | PLANT 2 | PLANT 3
NUMBER: (2) TANKS | (2) TANKS | (2) TANKS
DIMENSIONS: 16.2x16.2x3.0 m | 6.6x27.7x3.7 m | 14.6x23.2x3.7 m
TOTAL VOL: 1366 m³ | 1976 m³ | 2476 m³
SURF. AREA: 460 m² | 640 m² | 678 m²
RET. TIME: 2.6 hr (total, design)
SLUDGE DEWATERING
TYPE: BELT FILTER PRESS
NUMBER: (2) FILTERS
CAPACITY: 17.2 l/s
SOLIDS INPUT: 3% OUTPUT: 20%
Dewatered Sludge Sample
TO DRYING BEDS OR LANDFILL SITE
Secondary Effluent Sample
LOWLIFT PUMPS
ROTATING BIOLOGICAL CONTACTORS
NUMBER: (4) TANKS
DISCS: (8) PER TANK
DIMEN: 7.0x39.6x1.6 m
TOTAL VOL: 1966 m³
TOTAL MEDIA SURF. AREA: 400040 m²
RET. TIME: 53 min (design)
Overflow (back-up for power failure)
CHLORINE
FILTRATION
NUMBER: (2) FILTERS
TYPE: DUEL MEDIA SAND FILTERS
MEDIA: SAND/ANTHRACITE
SURF. AREA: 520 m²
By-Pass
CHLORINATION
CONTACT TIME: 20 min (design)
DOSAGE: 0.5 mg/l Resid. Maint. (Chlorine added prior to filtration)
Effluent Sample
EFFLUENT TO SPEED RIVER
CANVIRO

GUELPH WPCP
Conventional Activated Sludge
Phosphorus Removal - Continuous
Effluent Polishing
Capacity - 54.552 10(3)m3/day

PARAMETER	1981	1982	1983	1984	1985	MEAN ANNUAL AVERAGE
Avg. Daily Flow (1000 m3/day)	42.32	44.32	44.38	43.57	47.72	44.45
BOD5 - Influent (mg/L)	200.00	169.90	189.73	206.17	180.42	189.24
BOD5 - Effluent (mg/L)	18.00	24.40	14.00	15.55	7.52	15.89
Annual BOD5 Significantly Different from Mean Annual Average BOD5?	I.D.	I.D.	I.D.	I.D.	I.D.	
TSS - Influent (mg/L)	378.00	196.10	248.36	432.75	245.00	300.06
TSS - Effluent (mg/L)	16.00	14.50	10.42	11.00	7.73	11.94
Annual TSS Significantly Different from Mean Annual Average TSS?	I.D.	I.D.	I.D.	I.D.	I.D.	
Total P - Influent (mg/L)	10.00	6.00	9.70	12.79	7.82	9.44
Total P - Effluent (mg/L)	1.20	1.55	1.55	0.96	0.83	1.22
Annual TP Significantly Different from Mean						
Annual Average TP?	I.D.	I.D.	I.D.	I.D.	I.D.	
TP in Compliance?	N	N	N	Y	Y	N

I.D. - Insufficient Data

R

SOURCES OF MUNICIPAL WATER POLLUTION CONTROL PLANT RAW SEWAGE

GENERAL DESCRIPTION OF WATER POLLUTION CONTROL PLANT (WPCP)

NAME OF WPCP	GUELPH WPCP
WORKS NUMBER	120003094
TREATMENT TYPE	CONVENTIONAL ACTIVATED SLUDGE PHOSPHORUS REMOVAL CONTINUOUS EFFLUENT POLISHING
DESIGN CAPACITY (1000 m3/d)	54.552
1986 AVERAGE DAY FLOW (1000 m3/d)	46.267
POPULATION SERVED	82000
POPULATION SERVED	

% OF TOTAL FLOW ATTRIBUTED TO:

INDUSTRIAL SOURCES (%)	25
COMMERCIAL SOURCES (%) (Population x 0.0757)	13
RESIDENTIAL SOURCES (%) (Population x 0.175)	31
UNACCOUNTED FOR, INCL. INFILTRATION (100-% Contributed from industrial, commercial and residential sources)	31

PROFILE OF INDUSTRIES IN CATCHMENT

TOTAL NO OF INDUSTRIES	307
INDUSTRIES WITH WATER	180
NO OF SIC CATEGORIES	46

DESCRIPTION OF THE TOP 5 INDUSTRIES DISCHARGED TO THE WPCP (BASED ON WATER USE DATA)

DESCRIPTION	SIC	# OF COMPANIES
COPPER FORMING	3357-3357	2
MACHINERY MFG	3500-3599	44
TRANSPORTATION EQUIPMENT	3711-3799	12
ELECTRICAL & ELECTRONIC COMPONENTS	3612-3690	14
GLASS MFG	3211-3229	1

OPERATIONAL EVALUATION FOR: G U E L P H W P C P

TREATMENT FACILITY: Other (RBC's)
PERIOD ENDING: March 27, 1987
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: 54,553 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
RAW SEWAGE FLOW	52,780	49,450	50,070	50,850	49,620	45,500	42,960
% of Design Flow	96.75%	90.65%	91.78%	93.21%	90.96%	83.41%	78.75%
Influent BOD (mg/L)				241.0	273.0		
Primary BOD (mg/L)				129.0	176.0		
Final BOD (mg/L)				7.3	11.0		
% PRIMARY REMOVAL				46.5%	35.5%		
% FINAL REMOVAL				97.0%	96.0%		
Influent SS (mg/L)	622.0	320.0	434.0	305.0	305.0		
Primary SS (mg/L)	119.0	139.0	149.0	127.0	162.0		
Final SS (mg/L)	19.0	22.0	10.0	26.0	24.0		
% PRIMARY REMOVAL	80.9%	56.6%	65.7%	58.4%	46.9%		
% FINAL REMOVAL	96.9%	93.1%	97.7%	91.5%	92.1%		
Influent NH4 (mg/L)					13.7		
Primary NH4 (mg/L)					12.5		
Final NH4 (mg/L)					3.8		
% PRIMARY REMOVAL					8.8%		
% FINAL REMOVAL					72.3%		
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Final TKN (mg/L)							
% PRIMARY REMOVAL							
% FINAL REMOVAL							
Influent Total P (mg/L)	9.30	7.10	8.70	8.30	7.30		
Primary Total P (mg/L)	3.80	4.40	3.30	5.00	5.00		
Final Total P (mg/L)	0.70	0.70	0.50	0.80	0.70		
% PRIMARY REMOVAL	59.1%	38.0%	62.1%	39.8%	31.5%		
% FINAL REMOVAL	92.5%	90.1%	94.3%	90.4%	90.4%		

NOTE : NH4 samples were unpreserved!

OPERATIONAL EVALUATION FOR: G U E L P H W P C P

TREATMENT FACILITY: Other (RBC's)
PERIOD ENDING: March 27, 1987
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: 54,553 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 8	DAY 9	DAY 10	DAY 11	DAY 12	DAY 13	DAY 14
RAW SEWAGE FLOW	45,020	47,050	44,870	48,740	47,160	43,310	41,150
% of Design Flow	82.53%	86.25%	82.25%	89.34%	86.45%	79.39%	75.43%
Influent BOD (mg/L)	259.0	246.0	290.0				
Primary BOD (mg/L)	176.0	136.0	159.0				
Final BOD (mg/L)	14.0	20.0	15.0				
% PRIMARY REMOVAL	32.0%	44.7%	45.2%				
% FINAL REMOVAL	94.6%	91.9%	94.8%				
Influent SS (mg/L)	341.0	320.0	333.0				
Primary SS (mg/L)	202.0	152.0	242.0				
Final SS (mg/L)	16.0	15.0	33.0				
% PRIMARY REMOVAL	40.8%	52.5%	27.3%				
% FINAL REMOVAL	95.3%	95.3%	90.1%				
Influent NH4 (mg/L)	9.6	15.4	15.5				
Primary NH4 (mg/L)	15.4	16.5	15.0				
Final NH4 (mg/L)	0.4	0.7	1.5				
% PRIMARY REMOVAL	-60.4%	-7.1%	3.2%				
% FINAL REMOVAL	95.8%	95.5%	90.3%				
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Final TKN (mg/L)							
% PRIMARY REMOVAL							
% FINAL REMOVAL							
Influent Total P (mg/L)	8.70	8.00	8.30				
Primary Total P (mg/L)	5.70	4.70	6.00				
Final Total P (mg/L)	0.90	0.90	0.70				
% PRIMARY REMOVAL	34.5%	41.2%	27.7%				
% FINAL REMOVAL	89.7%	88.7%	91.6%				

NOTE : NH4 samples were unpreserved!

OPERATIONAL EVALUATION FOR: G U E L P H W P C P

TREATMENT FACILITY: Other (RBC's)
PERIOD ENDING: March 27, 1987
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: 54,553 m3/d

PARAMETER	SAMPLING PERIOD DAY 15	DAY 16	DAY 17	DAY 18	DAY 19	DAY 20	DAY 21
RAW SEWAGE FLOW	45,590	47,990	48,950	48,970	49,360		
% of Design Flow	83.57%	87.97%	89.73%	89.77%	90.48%		
Influent BOD (mg/L)			213.0	320.0			
Primary BOD (mg/L)			125.0	207.0			
Final BOD (mg/L)			4.0	14.0			
% PRIMARY REMOVAL			41.3	35.3			
% FINAL REMOVAL			98.1	95.6			
Influent SS (mg/L)	338.0	343.0	319.0	532.0	400.0		
Primary SS (mg/L)	158.0	88.0	146.0	159.0	162.0		
Final SS (mg/L)	10.8	13.0	10.0	15.0	23.0		
% PRIMARY REMOVAL	53.3	74.3	54.2	70.1	59.5		
% FINAL REMOVAL	96.8	96.2	96.9	97.2	94.2		
Influent NH4 (mg/L)	10.2	15.5	16.7	16.0	17.4		
Primary NH4 (mg/L)	13.0	16.0	14.4	14.8	18.2		
Final NH4 (mg/L)	1.2	1.1	0.8	1.2	0.9		
% PRIMARY REMOVAL	-27.5	-3.2	13.8	7.5	-4.6		
% FINAL REMOVAL	88.2	92.9	95.2	92.5	94.8		
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Final TKN (mg/L)							
% PRIMARY REMOVAL							
% FINAL REMOVAL							
Influent Total P (mg/L)	9.30	9.30	8.30	8.70	8.70		
Primary Total P (mg/L)	5.30	4.50	4.30	5.00	4.60		
Final Total P (mg/L)	0.50	0.40	0.40	0.40	0.50		
% PRIMARY REMOVAL	43.0	51.6	48.2	42.5	47.1		
% FINAL REMOVAL	94.6	95.7	95.2	95.4	94.3		

NOTE : NH4 samples were unpreserved!

OPERATIONAL EVALUATION FOR: G U E L P H W P C P

TREATMENT FACILITY: Other (RBC's)
PERIOD ENDING: May 8, 1988
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 54,553 m3/d

PARAMETER	PRE-SAMPLING PERIOD DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
RAW SEWAGE FLOW	47,600	51,770	46,540	48,070	49,350	42,620	40,470
% of Design Flow	87.25%	94.90%	85.31%	88.12%	90.46%	78.13%	74.18%
Influent BOD (mg/L)			219.0	176.0	284.0		
Primary BOD (mg/L)			149.0	172.0	206.0		
Final BOD (mg/L)			24.0	6.0	18.0		
% PRIMARY REMOVAL			32.0%	2.3%	27.5%		
% FINAL REMOVAL			89.0%	96.6%	93.7%		
Influent SS (mg/L)		329.0	267.0	244.0	363.0		
Primary SS (mg/L)		194.0	179.0	159.0	180.0		
Final SS (mg/L)		16.0	40.0	20.0	28.0		
% PRIMARY REMOVAL		41.0%	33.0%	34.8%	50.4%		
% FINAL REMOVAL		95.1%	85.0%	91.8%	92.3%		
Influent NH4 (mg/L)			7.9	10.2	15.5		
Primary NH4 (mg/L)			12.8	12.6	16.0		
Final NH4 (mg/L)			1.3	1.2	1.1		
% PRIMARY REMOVAL			-62.0%	-23.5%	-3.2%		
% FINAL REMOVAL			83.5%	88.2%	92.9%		
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Final TKN (mg/L)							
% PRIMARY REMOVAL							
% FINAL REMOVAL							
Influent Total P (mg/L)		8.00	6.30	5.30	8.30		
Primary Total P (mg/L)		5.30	4.60	5.00	5.30		
Final Total P (mg/L)		0.80	0.90	0.70	0.70		
% PRIMARY REMOVAL		33.7%	27.0%	5.7%	36.1%		
% FINAL REMOVAL		90.0%	85.7%	86.8%	91.6%		

NOTE : NH4 samples were unpreserved!

OPERATIONAL EVALUATION FOR: G U E L P H W P C P

TREATMENT FACILITY: Other (RBC's)
PERIOD ENDING: May 8, 1988
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 54,553 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 8	DAY 9	DAY 10	DAY 11	DAY 12	DAY 13	DAY 14
RAW SEWAGE FLOW	42,040	46,420	46,750	45,660	45,510	44,580	36,150
% of Design Flow	77.06%	85.09%	85.70%	83.70%	83.42%	81.72%	66.27%
Influent BOD (mg/L)			285.0	225.0	226.0		
Primary BOD (mg/L)			196.0	155.0	150.0		
Final BOD (mg/L)			28.0	35.0	32.0		
% PRIMARY REMOVAL			31.2%	31.1%	33.6%		
% FINAL REMOVAL			90.2%	84.4%	85.8%		
Influent SS (mg/L)			256.0	349.0	278.0		
Primary SS (mg/L)			172.0	133.0	164.0		
Final SS (mg/L)			22.0	43.0	37.0		
% PRIMARY REMOVAL			32.8%	61.9%	41.0%		
% FINAL REMOVAL			91.4%	87.7%	86.7%		
Influent NH4 (mg/L)			11.4	9.1	11.8		
Primary NH4 (mg/L)			12.2	12.8	11.6		
Final NH4 (mg/L)			1.5	1.0	3.4		
% PRIMARY REMOVAL			-7.0%	-40.7%	1.7%		
% FINAL REMOVAL			86.8%	89.0%	71.2%		
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Final TKN (mg/L)							
% PRIMARY REMOVAL							
% FINAL REMOVAL							
Influent Total P (mg/L)		8.80	6.00	8.60	9.30		
Primary Total P (mg/L)		6.70	3.70	4.40	4.70		
Final Total P (mg/L)		0.70	0.80	0.90	1.00		
% PRIMARY REMOVAL		23.9%	38.3%	48.8%	49.5%		
% FINAL REMOVAL		92.0%	86.7%	89.5%	89.2%		

NOTE : NH4 samples were unpreserved!

OPERATIONAL EVALUATION FOR: GUELPH WPCP

TREATMENT FACILITY: Other (RBC's)
PERIOD ENDING: May 8, 1988
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 54,553 m3/d

PARAMETER	SAMPLING PERIOD DAY 15	DAY 16	DAY 17	DAY 18	DAY 19	DAY 20	DAY 21
RAW SEWAGE FLOW	42,680	46,910	47,410	46,130	46,000		
% of Design Flow	78.24%	85.99%	86.91%	84.56%	84.32%		
Influent BOD (mg/L)			255.0	175.0	210.0		
Primary BOD (mg/L)			160.0	159.0	165.0		
Final BOD (mg/L)			12.0	38.0	28.0		
% PRIMARY REMOVAL			37.3%	9.1%	21.4%		
% FINAL REMOVAL			95.3%	78.3%	86.7%		
Influent SS (mg/L)			345.0	297.0	281.0		
Primary SS (mg/L)			166.0	173.0	132.0		
Final SS (mg/L)			21.0	70.0	79.0		
% PRIMARY REMOVAL			51.9%	41.8%	53.0%		
% FINAL REMOVAL			93.9%	76.4%	71.9%		
Influent NH4 (mg/L)			9.2	12.2	11.3		
Primary NH4 (mg/L)			12.5	12.9	13.0		
Final NH4 (mg/L)			3.8	2.6	3.3		
% PRIMARY REMOVAL			-35.9%	-5.7%	-15.0%		
% FINAL REMOVAL			58.7%	78.7%	70.8%		
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Final TKN (mg/L)							
% PRIMARY REMOVAL							
% FINAL REMOVAL							
Influent Total P (mg/L)	9.30	7.30	8.30	6.70	7.90		
Primary Total P (mg/L)	5.30	4.70	5.30	7.30	4.70		
Final Total P (mg/L)	1.00	0.90	0.80	0.90	1.00		
% PRIMARY REMOVAL	43.0%	35.6%	36.1%	-9.0%	40.5%		
% FINAL REMOVAL	89.2%	87.7%	90.4%	86.6%	87.3%		

NOTE : NH4 samples were unpreserved!

PLANT NAME : Guelph
PLANT TYPE : Tertiary

SAMPLING TYPE : Raw Sewage
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	PLANT MIN. CONC. > MDL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0	95.60	305.00	9	9	100.0	267	266	99.6	152.61	140.23	1.43	1.93	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0	328.00	482.00	9	9	100.0	260	258	99.2	385.15	287.75	1.15	1.82	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0	14.50	50.00	9	9	100.0	271	271	100.0	31.24	22.39	1.49	1.81	100.0
NNHTPR	AMMONIUM,TOTAL FILT.REAC.	mg/L	0	11.80	19.20	9	9	100.0	275	274	99.6	14.21	15.37	1.16	1.69	100.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0	19.80	31.00	9	9	100.0	273	273	100.0	25.18	25.44	1.13	1.47	100.0
PH	(-LOG(H+(CONCN))		0	6.55	8.00	9	9	100.0	275	275	100.0	6.99	6.90	1.06	1.05	100.0
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/L	0	3.18	7.97	10	10	100.0	248	248	100.0	5.57	5.18	1.29	1.51	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0	118.00	611.00	8	8	100.0	267	266	99.6	203.22	126.88	1.70	1.93	100.0
NNO2PR	NITRITE,FILT. REACT.	mg/L	0	0.03	0.03	9	1	11.1	271	58	21.4	0.00	0.01	2.16	2.98	51.4
METALS																
CCNPUR	CYANIDE-FREE,UNFILT.REAC.	ug/L	0	80.00	620.00	9	9	100.0	271	82	30.3	200.00	1.90	1.92	6.88	32.4
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	170.00	520.00	11	11	100.0	322	237	73.6	330.00	51.10	1.33	3.44	89.2
CUUT	COPPER,UNFILT.TOTAL	ug/L	0	130.00	190.00	2	2	100.0	49	48	98.0	160.00	110.60	1.31	2.28	97.1
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	0.25	1.30	9	9	100.0	283	274	96.8	0.70	0.23	1.64	2.11	100.0
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	1100.00	1400.00	11	11	100.0	319	318	99.7	1270.00	370.70	1.07	2.14	100.0
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	1000.00	5300.00	11	11	100.0	322	315	97.8	2390.00	211.00	1.66	2.94	100.0
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	230.00	5100.00	11	10	90.9	322	306	95.0	500.00	1000.10	2.69	2.65	97.3
CDUT	CADMIUM,UNFILT.TOTAL	ug/L	0	10.00	30.00	11	5	45.5	322	76	23.6	10.00	6.50	2.04	2.09	70.3
COUT	COBALT,UNFILT.TOTAL	ug/L	0	20.00	80.00	11	3	27.3	322	82	25.5	10.00	9.30	2.98	2.31	83.8
NIUT	NICKEL,UNFILT.TOTAL	ug/L	0	50.00	370.00	11	3	27.3	322	103	32.0	40.00	38.80	2.47	2.70	54.1
AGUT	SILVER,UNFILT.TOTAL	ug/L	0	20.00	30.00	11	2	18.2	321	82	25.6	10.00	10.40	2.41	2.55	75.7
PBUT	LEAD,UNFILT.TOTAL	ug/L	0	60.00	120.00	11	2	18.2	322	57	17.7	60.00	59.50	1.30	1.86	51.4
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PMMCRE	M-CRESOL	ug/L	1	19.40	60.30	10	6	60.0	275	167	60.7	20.12	25.59	2.54	3.45	86.5
PMPHEN	PHENOL	ug/L	2	16.10	42.80	10	6	60.0	275	118	42.9	16.50	14.52	2.08	2.46	78.6
PMBBP	BUTYLBENZYLPHTHALATE	ug/L	1	10.10	82.90	10	5	50.0	275	34	12.4	9.86	5.85	2.50	1.66	37.8
PMOCRE	O-CRESOL	ug/L	2	22.00	216.50	10	2	20.0	275	6	2.2	11.69	7.72	2.94	1.39	8.1
PM24DP	2,4-DICHLOROPHENOL	ug/L	1	76.80	76.80	10	1	10.0	275	1	0.4	14.99	12.57	1.78	1.29	2.7
PM24MP	2,4-DIMETHYLPHENOL	ug/L	2	33.90	33.90	10	1	10.0	275	1	0.4	13.81	12.54	1.37	1.27	2.7
PM2NP	2-NITROPHENOL	ug/L	1	29.40	29.40	10	1	10.0	275	1	0.4	13.62	12.53	1.31	1.26	2.7
PM46DP	2-METHYL4,6-DINITROPHENOL	ug/L	2	79.40	79.40	10	1	10.0	275	1	0.4	15.04	12.57	1.79	1.29	2.7
PM4BPE	4-BROMOPHENYLPHENYLETHER	ug/L	1	181.40	181.40	10	1	10.0	275	1	0.4	10.31	7.58	2.74	1.35	2.7
PM4CPE	4-CHLOROPHENYLPHENYLETHER	ug/L	1	95.50	95.50	10	1	10.0	275	1	0.4	6.72	5.05	2.54	1.33	2.7
PM4NP	4-NITROPHENOL	ug/L	2	36.10	36.10	10	1	10.0	275	3	1.1	13.90	12.65	1.40	1.29	8.1
PMB2EM	BIS(2-CHLOROETHOXY)METHANE	ug/L	1	106.70	106.70	10	1	10.0	275	2	0.7	6.79	5.09	2.63	1.38	5.4
PMB2IE	BIS(2-CHLOROISOPROPYL)ETHER	ug/L	1	124.00	124.00	10	1	10.0	275	1	0.4	6.89	5.05	2.76	1.35	2.7
PMB2NE	BIS-(2-CHLOROMETHYL)ETHER	ug/L	2	101.50	101.50	10	1	10.0	275	2	0.7	9.73	7.61	2.28	1.34	5.4
PMDMP	DIMETHYL PHTHALATE	ug/L	1	117.60	117.60	10	1	10.0	275	4	1.5	6.86	5.10	2.71	1.37	5.4
PMNND	N-NITROSO-DI-PHENYLAMINE	ug/L	1	121.60	121.60	10	1	10.0	275	1	0.4	6.88	5.05	2.74	1.35	2.7
PMNNP	N-NITROSO-DI-NPROPYLAMINE	ug/L	1	103.90	103.90	10	1	10.0	275	2	0.7	6.77	5.09	2.61	1.37	5.4
PMPCMC	P-CHLORO-M-CRESOL	ug/L	1	104.70	104.70	10	1	10.0	275	1	0.4	15.46	12.59	1.96	1.30	2.7
X30010	2-CHLOROPHENOL	ug/L	0	32.20	32.20	10	1	10.0	275	1	0.4	13.74	12.53	1.35	1.26	2.7
X3246	2,4,6-TRICHLOROPHENOL	ug/L	1	30.50	30.50	10	1	10.0	275	1	0.4	13.67	12.53	1.33	1.26	2.7
X3PCPH	PENTACHLOROPHENOL	ug/L	1	118.40	118.40	10	1	10.0	275	5	1.8	15.65	12.94	2.04	1.42	10.8
PESTICIDES,HERBICIDES,PCBS																
P324D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	0.11	1.20	10	10	100.0	276	214	77.5	0.35	0.13	2.16	3.72	100.0
P1BHCG	GAMMA-BHC(HEXCHLORCYCLHEXANE)	ug/L	2	0.04	2.70	10	7	70.0	276	143	51.8	0.06	0.02	5.63	2.29	94.6
P1BHCA	ALPHA-BHC(HEXCHLORCYCLHEXANE)	ug/L	1	0.03	0.10	10	5	50.0	276	16	5.8	0.02	0.01	2.64	1.50	18.9

PLANT NAME : Guelph
PLANT TYPE : Tertiary

SAMPLING TYPE : Raw Sewage
SAMPLE FORM : Wet Weight

CONTAMINANT	CONTAMINANT NAME	UNITS	QC CODE	PLANT MIN. CONC. > MDL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
PESTICIDES,HERBICIDES,PCBS																
P1DMDT	METHOXYCHLOR	ug/L	1	0.10	4.20	10	5	50.0	276	47	17.0	0.27	0.08	7.86	3.14	43.2
P1BHCB	BETA-BHC (HEXCHLORCYCLHEXANE)	ug/L	1	0.04	0.09	10	4	40.0	276	32	11.6	0.02	0.01	2.73	1.66	35.1
P1PCBT	PCB, TOTAL	ug/L	2	0.11	0.15	10	3	30.0	276	42	15.2	0.06	0.06	1.79	2.31	46.0
P1DIEL	DIELDRIN	ug/L	2	0.03	0.03	10	1	10.0	276	8	2.9	0.01	0.01	1.42	1.28	18.9
P1ENDR	ENDRIN	ug/L	3	0.03	0.03	10	1	10.0	276	5	1.8	0.01	0.01	1.42	1.34	10.8
P1END5	ENDOSULFAN SULPHATE	ug/L	3	0.12	0.12	10	1	10.0	276	13	4.7	0.04	0.04	1.42	1.56	16.2
P1PMIR	MIREX PHOTO	ug/L	2	0.03	0.03	10	1	10.0	276	1	0.4	0.01	0.01	1.42	1.18	2.7
P3SILV	SILVEX	ug/L	3	0.10	0.10	10	1	10.0	276	28	10.1	0.05	0.06	1.25	1.68	40.5
VOLATILES ORGANIC COMPOUNDS																
B2EBNZ	ETHYLBENZENE	ug/L	1	57.00	1200.00	10	9	90.0	274	30	11.0	139.35	23.50	3.20	1.75	29.7
B2MPXY	M-, AND P-XYLENES	ug/L	1	109.00	1700.00	10	9	90.0	274	43	15.7	189.03	26.00	3.23	2.02	37.8
B2OXYL	O-XYLENE	ug/L	1	53.00	570.00	10	5	50.0	274	25	9.1	48.72	22.47	3.10	1.56	24.3
X1CHLO	CHLOROFORM	ug/L	1	79.00	230.00	10	5	50.0	274	28	10.2	52.00	23.90	2.89	1.75	32.4
X1TETR	TETRACHLOROETHYLENE	ug/L	1	40.00	280.00	10	5	50.0	274	12	4.4	45.40	21.51	2.77	1.53	18.9
X1111T	1,1,1-TRICHLOROETHANE	ug/L	1	46.00	280.00	10	3	30.0	274	21	7.7	34.38	23.18	2.64	1.74	18.9
B2STYR	STYRENE	ug/L	1	48.00	48.00	10	1	10.0	274	9	3.3	21.83	21.40	1.32	1.39	10.8
X111CE	1,1-DICHLOROETHANE	ug/L	1	250.00	250.00	10	1	10.0	274	1	0.4	25.75	20.19	2.22	1.16	2.7
X1BDCM	BROMODICHLOROMETHANE	ug/L	1	18.00	18.00	10	1	10.0	274	2	0.7	28.51	30.10	1.18	1.10	5.4
X1CDCE	CIS-1,2-DICHLOROETHYLENE	ug/L	1	130.00	130.00	10	1	10.0	274	1	0.4	24.12	20.14	1.81	1.12	2.7
X1DCLE	1,1-DICHLOROETHENE	ug/L	1	200.00	200.00	10	1	10.0	274	7	2.6	25.18	20.55	2.07	1.28	13.5
X1TRIC	TRICHLOROETHYLENE	ug/L	1	130.00	130.00	10	1	10.0	274	15	5.5	24.12	22.59	1.81	1.82	16.2

PLANT NAME : Guelph
PLANT TYPE : Tertiary

SAMPLING TYPE : Secondary Effluent
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	STD. FOR SURFACE WATER	STD. REF.	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET.	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																		
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0		-	6.40	67.80	8	8	100.0	213	211	99.1	26.40	21.22	2.41	2.07	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0		-	46.00	194.00	9	9	100.0	213	211	99.1	87.04	52.80	1.83	1.83	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0		-	6.60	9.40	9	9	100.0	220	220	100.0	8.03	8.09	1.16	1.60	100.0
NNHTPR	AMMONIUM,TOTAL FILT.REAC.	mg/L	0		-	3.45	5.75	9	9	100.0	223	204	91.5	4.52	3.90	1.19	6.98	100.0
NNO2PR	NITRITE,FILT. REACT.	mg/L	0		-	0.22	0.69	9	9	100.0	220	194	88.2	0.40	0.22	1.40	5.95	96.4
NNOTPR	NITRATES,TOTAL FILT.REAC.	mg/L	0		-	9.10	13.40	9	9	100.0	224	186	83.0	11.93	2.33	1.13	7.75	96.4
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0		-	5.40	16.80	9	9	100.0	222	222	100.0	7.08	7.97	1.41	2.71	100.0
PH	(-LOG(H+(CONC'N))		0		-	6.80	8.18	9	9	100.0	224	224	100.0	7.36	7.10	1.08	1.05	100.0
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/L	0		-	0.28	5.30	10	10	100.0	211	206	97.6	0.74	0.68	2.81	1.97	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0		-	5.30	45.00	9	9	100.0	220	219	99.6	14.58	10.12	2.39	2.00	100.0
METALS																		
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	75.00	ONT-MOE	370.00	3700.00	11	11	100.0	264	196	74.2	780.00	101.70	2.15	3.72	96.4
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	0.20	ONT-MOE	0.04	0.36	9	9	100.0	233	220	94.4	0.10	0.03	2.32	2.62	100.0
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	3750.00	ONT-MOE	1000.00	1370.00	11	11	100.0	267	267	100.0	1160.00	340.90	1.11	2.14	100.0
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	30.00	ONT-MOE	440.00	1400.00	11	11	100.0	267	262	98.1	700.00	53.30	1.38	2.48	100.0
CDUT	CADMIUM,UNFILT.TOTAL	ug/L	0	0.20	ONT-MOE	0.00	10.00	11	10	90.9	267	65	24.3	10.00	2.10	1.53	2.07	71.4
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	100.00	ONT-MOE	10.00	120.00	11	10	90.9	267	137	51.3	20.00	9.00	2.76	2.00	89.3
CCNPUR	CYANIDE-FREE,UNFILT.REAC.	ug/L	0	5.00	ONT-MOE	10.00	10.00	9	6	66.7	222	42	18.9	0.00	1.30	2.71	3.68	46.4
NIUT	NICKEL,UNFILT.TOTAL	ug/L	0	25.00	ONT-MOE	10.00	80.00	11	7	63.6	267	171	64.0	20.00	22.10	2.88	3.60	85.7
CUUT	COPPER,UNFILT.TOTAL	ug/L	0	5.00	ONT-MOE	90.00	90.00	2	1	50.0	47	30	63.8	20.00	13.10	7.72	2.56	77.8
COUT	COBALT,UNFILT.TOTAL	ug/L	0	5.00	NYS-STD	10.00	20.00	11	4	36.4	266	65	24.4	10.00	6.40	1.77	1.54	82.1
MOUT	MOLYBDENUM,UNFILT.TOTAL	ug/L	0		-	10.00	10.00	11	1	9.1	267	75	28.1	10.00	6.60	1.32	1.56	67.9
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																		
PM24DP	2,4-DICHLOROPHENOL	ug/L	1	0.20	ONT-MOE	28.80	28.80	10	1	10.0	227	1	0.4	3.19	2.68	2.17	1.52	3.6
PM24DT	2,4-DINITROTOLUENE	ug/L	1		-	23.90	23.90	10	1	10.0	228	1	0.4	1.98	1.61	2.40	1.53	3.6
PM26DT	2,6-DINITROTOLUENE	ug/L	1	0.07	NYS-GUL	26.80	26.80	10	1	10.0	228	1	0.4	2.00	1.61	2.49	1.53	3.6
PM2NP	2-NITROPHENOL	ug/L	1		-	28.50	28.50	10	1	10.0	227	1	0.4	3.19	2.68	2.16	1.52	3.6
PM46DP	2-METHYL,4,6-DINITROPHENOL	ug/L	2		-	143.70	143.70	10	1	10.0	227	1	0.4	3.75	2.70	3.60	1.60	3.6
PM4NP	4-NITROPHENOL	ug/L	2		-	20.80	20.80	10	1	10.0	227	1	0.4	3.09	2.67	1.95	1.50	3.6
PMB2EM	BIS(2-CHLOROETHOXY)METHANE	ug/L	1		-	32.80	32.80	10	1	10.0	228	1	0.4	1.42	1.08	3.02	1.56	3.6
PMB2NE	BIS-(2-CHLOROMETHYL)ETHER	ug/L	2		-	30.60	30.60	10	1	10.0	228	1	0.4	2.03	1.61	2.60	1.54	3.6
PMDNP	N-NITROSO-DI-NPROPYLAMINE	ug/L	1		-	43.60	43.60	10	1	10.0	228	1	0.4	1.46	1.08	3.30	1.58	3.6
PMPCMC	P-CHLORO-M-CRESOL	ug/L	1		-	15.20	15.20	10	1	10.0	227	2	0.9	2.99	2.68	1.77	1.50	7.1
PNBAA	BENZO(A)ANTHRACENE	ug/L	1	0.00	NYS-GUL	29.40	29.40	10	1	10.0	228	1	0.4	1.40	1.08	2.91	1.56	3.6
PNBKF	BENZO(K)FLUORANTHENE	ug/L	1	0.00	NYS-GUL	14.60	14.60	10	1	10.0	228	1	0.4	1.31	1.07	2.33	1.53	3.6
PNPHEN	PHENANTHRENE	ug/L	1	50.00 §	NYS-GUL	17.80	17.80	10	1	10.0	228	1	0.4	1.33	1.07	2.49	1.53	3.6
PNPYR	PYRENE	ug/L	1	50.00	NYS-GUL	29.40	29.40	10	1	10.0	228	1	0.4	2.02	1.61	2.56	1.54	3.6
X30810	2-CHLOROPHENOL	ug/L	0	7.00	ONT-MOE	5.10	5.10	10	1	10.0	227	1	0.4	2.68	2.66	1.25	1.47	3.6
X3246	2,4,6-TRICHLOROPHENOL	ug/L	1	18.00	ONT-MOE	9.20	9.20	10	1	10.0	227	1	0.4	2.85	2.66	1.51	1.48	3.6
X3PCPH	PENTACHLOROPHENOL	ug/L	1	0.50	ONT-MOE	58.70	58.70	10	1	10.0	227	3	1.3	3.43	2.71	2.71	1.56	7.1
PESTICIDES,HERBICIDES,PCBS																		
P1BHC0	GAMMA-BHC(HEXCHLORCYCLHEXANE)	ug/L	2	0.06	ONT-MOE	0.02	0.79	10	10	100.0	227	157	69.2	0.06	0.02	2.67	2.48	96.4
P24D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	4.00	ONT-MOE	0.04	0.54	10	10	100.0	227	177	78.0	0.16	0.08	2.37	4.71	100.0
P1DMDT	METHOXYCHLOR	ug/L	1	0.04	ONT-MOE	0.06	3.30	10	5	50.0	227	31	13.7	0.12	0.04	8.03	2.72	35.7

PLANT NAME : Guelph
PLANT TYPE : Tertiary

SAMPLING TYPE : Secondary Effluent
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	STD. FOR SURFACE WATER	STD. REF.	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET.	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
PESTICIDES,HERBICIDES,PCBS																		
X2124	1,2,4-TRICHLOROBENZENE	ug/L	3	0.50	ONT-MOE	0.02	0.04	10	5	50.0	227	36	15.9	0.01	0.01	2.58	2.44	32.1
P1BHCB	BETA-BHC (HEXCHLORCYCLHEXANE)	ug/L	1	0.01	ONT-MOE	0.04	0.07	10	3	30.0	227	9	4.0	0.01	0.01	3.22	1.58	21.4
P1BHCA	ALPHA-BHC(HEXCHLORCYCLHEXANE)	ug/L	1	0.00	NYS-GUL	0.02	0.02	10	2	20.0	227	5	2.2	0.01	0.01	1.79	1.24	14.3
P1PCBT	PCB, TOTAL	ug/L	2	0.00	ONT-MOE	0.13	0.17	10	2	20.0	227	9	4.0	0.03	0.02	2.34	1.40	28.6
VOLATILES ORGANIC COMPOUNDS																		
X1TETR	TETRACHLOROETHYLENE	ug/L	1	0.70	NYS-GUL	2.50	49.00	10	4	40.0	224	18	8.0	2.09	1.18	3.46	1.93	32.1
X1111T	1,1,1-TRICHLOROETHANE	ug/L	1	50.00	NYS-GUL	2.20	19.00	10	3	30.0	224	18	8.0	1.67	1.18	2.66	1.86	28.6
X1CHLO	CHLOROFORM	ug/L	1	0.20	NYS-STD	3.20	5.50	10	2	20.0	224	37	16.5	1.33	1.37	1.86	2.18	64.3

PLANT NAME : Guelph
PLANT TYPE : Tertiary

SAMPLING TYPE : Tertiary Effluent
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	PLANT MIN. CONC. > MDL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0	16.00	56.40	9	9	100.0	9	9	100.0	24.64	24.64	1.48	1.48	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0	46.00	282.00	9	9	100.0	9	9	100.0	99.25	99.25	1.80	1.80	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0	7.00	10.90	9	9	100.0	9	9	100.0	8.74	8.74	1.19	1.19	100.0
NNHTFR	AMMONIUM,TOTAL FILT.REAC.	mg/L	0	16.60	20.80	9	9	100.0	9	9	100.0	18.24	18.24	1.08	1.08	100.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0	19.80	34.00	9	9	100.0	9	9	100.0	23.22	23.22	1.17	1.17	100.0
PH	(-LOG(H+(CONCN))		0	6.82	7.49	9	9	100.0	9	9	100.0	7.10	7.10	1.04	1.04	100.0
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/L	0	0.78	5.93	10	10	100.0	10	10	100.0	1.56	1.56	1.92	1.92	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0	17.10	71.80	8	8	100.0	8	8	100.0	32.21	32.21	1.74	1.74	100.0
NNO2FR	NITRITE,FILT. REACT.	mg/L	0	0.03	0.15	9	8	88.9	9	8	88.9	0.05	0.05	3.45	3.45	100.0
NNOTFR	NITRATES,TOTAL FILT.REAC.	mg/L	0	0.40	0.50	9	5	55.6	9	5	55.6	0.14	0.14	4.23	4.23	100.0
METALS																
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	560.00	2900.00	11	11	100.0	11	11	100.0	1250.00	1252.00	1.88	1.88	100.0
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	30.00	270.00	11	11	100.0	11	11	100.0	70.00	68.80	1.84	1.84	100.0
CUUT	COPPER,UNFILT.TOTAL	ug/L	0	30.00	120.00	2	2	100.0	2	2	100.0	50.00	54.80	3.03	3.03	100.0
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	0.07	0.39	9	9	100.0	9	9	100.0	0.17	0.17	1.73	1.73	100.0
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	990.00	1400.00	11	11	100.0	11	11	100.0	1170.00	1170.70	1.11	1.11	100.0
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	650.00	1600.00	11	11	100.0	11	11	100.0	960.00	959.60	1.30	1.30	100.0
CCNFUR	CYANIDE-FREE,UNFILT.REAC.	ug/L	0	10.00	70.00	9	7	77.8	9	7	77.8	10.00	14.60	4.19	4.19	100.0
CDUT	CADMIUM,UNFILT.TOTAL	ug/L	0	10.00	20.00	11	3	27.3	11	3	27.3	10.00	6.30	1.74	1.74	100.0
COUT	COBALT,UNFILT.TOTAL	ug/L	0	10.00	70.00	11	3	27.3	11	3	27.3	10.00	9.00	2.75	2.75	100.0
PBUT	LEAD,UNFILT.TOTAL	ug/L	0	110.00	130.00	11	2	18.2	11	2	18.2	60.00	55.90	1.50	1.50	100.0
AGUT	SILVER,UNFILT.TOTAL	ug/L	0	10.00	10.00	11	1	9.1	11	1	9.1	10.00	6.60	2.02	2.02	100.0
MOUT	MOLYBDENUM,UNFILT.TOTAL	ug/L	0	40.00	40.00	11	1	9.1	11	1	9.1	10.00	11.30	1.52	1.52	100.0
NIUT	NICKEL,UNFILT.TOTAL	ug/L	0	40.00	40.00	11	1	9.1	11	1	9.1	30.00	25.80	1.12	1.12	100.0
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PM24MP	2,4-DIMETHYLPHENOL	ug/L	2	5.60	7.50	10	3	30.0	10	3	30.0	3.40	3.40	1.57	1.57	100.0
PMPHEN	PHENOL	ug/L	2	3.40	4.40	10	3	30.0	10	3	30.0	1.99	1.99	1.59	1.59	100.0
PM24DP	2,4-DICHLOROPHENOL	ug/L	1	9.90	9.90	10	1	10.0	10	1	10.0	2.87	2.87	1.55	1.55	100.0
PM24DT	2,4-DINITROTOLUENE	ug/L	1	5.30	5.30	10	1	10.0	10	1	10.0	1.70	1.70	1.49	1.49	100.0
PM26DT	2,6-DINITROTOLUENE	ug/L	1	7.70	7.70	10	1	10.0	10	1	10.0	1.77	1.77	1.68	1.68	100.0
PM2NP	2-NITROPHENOL	ug/L	1	6.00	6.00	10	1	10.0	10	1	10.0	2.73	2.73	1.32	1.32	100.0
PM46DP	2-METHYL4,6-DINITROPHENOL	ug/L	2	27.60	27.60	10	1	10.0	10	1	10.0	3.18	3.18	2.14	2.14	100.0
PMB2EM	BIS(2-CHLORETHOXY)METHANE	ug/L	1	14.80	14.80	10	1	10.0	10	1	10.0	1.31	1.31	2.34	2.34	100.0
PMB2NE	BIS-(2-CHLOROMETHYL)ETHER	ug/L	2	12.70	12.70	10	1	10.0	10	1	10.0	1.86	1.86	1.97	1.97	100.0
PMBBP	BUTYLBENZYLPHTHALATE	ug/L	1	3.30	3.30	10	1	10.0	10	1	10.0	1.13	1.13	1.46	1.46	100.0
PMDNP	N-NITROSO-DI-NPROPYLAMINE	ug/L	1	19.20	19.20	10	1	10.0	10	1	10.0	1.34	1.34	2.55	2.55	100.0
PNBAA	BENZO(A)ANTHRACENE	ug/L	1	12.60	12.60	10	1	10.0	10	1	10.0	1.29	1.29	2.23	2.23	100.0
PNBKF	BENZO(K)FLUORANTHENE	ug/L	1	4.60	4.60	10	1	10.0	10	1	10.0	1.16	1.16	1.62	1.62	100.0
PNPYR	PYRENE	ug/L	1	12.00	12.00	10	1	10.0	10	1	10.0	1.85	1.85	1.93	1.93	100.0
X3PCPH	PENTACHLOROPHENOL	ug/L	1	21.50	21.50	10	1	10.0	10	1	10.0	3.10	3.10	1.97	1.97	100.0
PESTICIDES,HERBICIDES,PCBS																
P24D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	0.05	0.67	10	9	90.0	10	9	90.0	0.12	0.12	2.56	2.56	100.0
P1BHCG	GAMMA-BHC(HEXACHLORCYCLHEXANE)	ug/L	2	0.02	0.75	10	8	80.0	10	8	80.0	0.04	0.04	3.37	3.37	100.0
P1BHCB	BETA-BHC (HEXACHLORCYCLHEXANE)	ug/L	1	0.05	0.17	10	3	30.0	10	3	30.0	0.02	0.02	3.03	3.03	100.0
P1DMDT	METHOXYCHLOR	ug/L	1	0.20	0.26	10	2	20.0	10	2	20.0	0.07	0.07	1.90	1.90	100.0

PLANT NAME : Guelph
PLANT TYPE : Tertiary

SAMPLING TYPE : Tertiary Effluent
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	PLANT MIN. CONC. > \ DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
PESTICIDES,HERBICIDES,PCBS																
P3SILV	SILVEX	ug/L	3	0.10	0.10	10	2	20.0	10	2	20.0	0.06	0.06	1.34	1.34	100.0
P1ENDR	ENDRIN	ug/L	3	0.05	0.05	10	1	10.0	10	1	10.0	0.01	0.01	1.66	1.66	100.0
P1PCBT	PCB, TOTAL	ug/L	2	0.16	0.16	10	1	10.0	10	1	10.0	0.05	0.05	1.55	1.55	100.0
X2124	1,2,4-TRICHLOROBENZENE	ug/L	3	0.05	0.05	10	1	10.0	10	1	10.0	0.01	0.01	1.66	1.66	100.0
VOLATILES ORGANIC COMPOUNDS																
X1TETR	TETRACHLOROETHYLENE	ug/L	1	5.80	50.00	10	5	50.0	10	5	50.0	3.50	3.50	4.30	4.30	100.0
X1111T	1,1,1-TRICHLOROETHANE	ug/L	1	2.70	75.00	10	4	40.0	10	4	40.0	2.30	2.30	4.02	4.02	100.0
X1CHLO	CHLOROFORM	ug/L	1	3.60	9.40	10	2	20.0	10	2	20.0	1.42	1.42	2.17	2.17	100.0
X1DCLE	1,1-DICHLOROETHENE	ug/L	1	6.10	14.00	10	2	20.0	10	2	20.0	1.56	1.56	2.61	2.61	100.0
E1DIEE	DIETHYL ETHER	ug/L	1	12.00	12.00	10	1	10.0	10	1	10.0	1.28	1.28	2.19	2.19	100.0
X111CE	1,1-DICHLOROETHANE	ug/L	1	7.80	7.80	10	1	10.0	10	1	10.0	1.23	1.23	1.91	1.91	100.0
X112CE	1,2-DICHLOROETHANE	ug/L	1	2.70	2.70	10	1	10.0	10	1	10.0	1.10	1.10	1.37	1.37	100.0
X1CDCE	CIS-1,2-DICHLOROETHYLENE	ug/L	1	5.00	5.00	10	1	10.0	10	1	10.0	1.17	1.17	1.66	1.66	100.0
X1TRIC	TRICHLOROETHYLENE	ug/L	1	9.70	9.70	10	1	10.0	10	1	10.0	1.26	1.26	2.05	2.05	100.0

PLANT NAME : Guelph **SAMPLING TYPE : Raw Sludge**
PLANT TYPE : Secondary **SAMPLE FORM : Dry Weight**

CONTAM-INANT	CONTAMINANT NAME	UNITSQA/QC (DRY WEIGHT)	CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
COD	CHEMICAL OXYGEN DEMAND	mg/kg	0	1240694.79	1269315.67	2	2	100.0	45	45	100.0	1254923.64	892221.45	1.02	3.19	100.0
NNHTPR	AMMONIUM,TOTAL FIL.T.REAC.	mg/kg	0	11960.30	12582.78	2	2	100.0	48	47	97.9	12267.59	5911.32	1.04	4.59	100.0
NNOTPR	NITRATES,TOTAL FIL.T.REAC.	mg/kg	0	24.28	34.74	2	2	100.0	48	43	89.6	29.04	25.44	1.29	2.21	93.9
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/kg	0	24.81	44150.11	2	2	100.0	51	51	100.0	1046.68	36897.85	198.73	2.98	100.0
PH	(-LOG)H+(CONCN))	mg/kg	0	5.78	5.97	2	2	100.0	49	49	100.0	5.87	6.03	1.02	1.10	100.0
PHNOL	PHENOLICS (4AAP)	mg/kg	0	114.14	207.51	2	2	100.0	50	41	82.0	153.90	82.34	1.53	3.54	85.3
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/kg	0	2.23	27152.32	2	2	100.0	42	42	100.0	246.25	20347.70	773.45	4.43	100.0
RST	RESIDUE, TOTAL	mg/kg	0	40300.00	45300.00	2	2	100.0	51	51	100.0	42726.92	32783.51	1.09	1.81	100.0
RSTLOI	RESIDUE,TOT.LOSS ON IGNI.	mg/kg	0	26200.00	31900.00	2	2	100.0	51	51	100.0	28909.86	20803.05	1.15	1.77	100.0
METALS																
AGUT	SILVER,UNFIL.T.TOTAL	mg/kg	0	20.60	20.60	1	1	100.0	45	40	88.9	20.60	30.17	0.00	2.61	84.4
ALUT	ALUMINUM,UNFILT.TOTAL	mg/kg	0	29332.01	31265.51	2	2	100.0	51	51	100.0	30283.33	9835.74	1.05	2.51	100.0
ASUT	ARSENIC,UNFIL.T.TOTAL	mg/kg	0	3.31	3.72	2	2	100.0	51	50	98.0	3.51	6.13	1.09	2.01	97.1
CDUT	CADMIUM,UNFIL.T.TOTAL	mg/kg	0	75.14	109.49	2	2	100.0	43	40	93.0	90.70	9.74	1.31	4.35	90.0
CRUT	CHROMIUM,UNFIL.T.TOTAL	mg/kg	0	1389.58	1480.57	2	2	100.0	51	50	98.0	1434.35	301.43	1.05	3.68	97.1
CUUT	COPPER,UNFIL.T.TOTAL	mg/kg	0	652.10	843.67	2	2	100.0	46	46	100.0	741.73	606.31	1.20	1.72	100.0
HGUT	MERCURY,UNFIL.T.TOTAL	mg/kg	0	4.42	6.70	2	2	100.0	50	50	100.0	5.44	2.23	1.34	1.67	100.0
MOUT	MOLYBDENUM,UNFIL.T.TOTAL	mg/kg	0	3.72	5.52	2	2	100.0	37	23	62.2	4.53	5.80	1.32	2.88	64.3
NIUT	NICKEL,UNFIL.T.TOTAL	mg/kg	0	37.31	54.09	2	2	100.0	46	44	95.7	44.92	59.17	1.30	2.90	93.3
PBUT	LEAD,UNFIL.T.TOTAL	mg/kg	0	272.46	333.11	2	2	100.0	49	48	98.0	301.26	173.99	1.15	2.24	96.9
SEUT	SELENIUM,UNFIL.T.TOTAL	mg/kg	0	1.10	2.48	2	2	100.0	50	48	96.0	1.66	3.04	1.77	1.93	93.9
SRUT	STRONTIUM,UNFIL.T.TOTAL	mg/kg	0	578.59	595.53	2	2	100.0	51	51	100.0	587.00	231.70	1.02	1.97	100.0
ZNUT	ZINC,UNFIL.T.TOTAL	mg/kg	0	5310.15	8833.75	2	2	100.0	51	51	100.0	6848.98	905.39	1.43	2.39	100.0
COUT	COBALT,UNFIL.T.TOTAL	mg/kg	0	11.48	11.48	2	1	50.0	41	30	73.2	2.67	9.29	7.87	4.69	73.3
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PMB2IE	BIS(2-CHLOROIPROPYL)ETHER	ug/kg	1	97130.20	97130.20	2	1	50.0	51	2	3.9	15524.80	3464.00	13.37	3.02	5.9
PMMCRE	M-CRESOL	ug/kg	1	612903.20	612903.20	2	1	50.0	51	42	82.3	45050.00	116847.30	40.11	12.16	85.3
DIOXINS AND FURANS																
P98CDD	OCTACHLORODIBENZODIOXIN	ug/kg	1	309.10	309.10	2	1	50.0	50	25	50.0	19.30	8.50	50.67	3.60	58.8
PESTICIDES,HERBICIDES,PCBS																
P1DMDT	METHOXYCHLOR	ug/kg	1	49.60	2030.90	2	2	100.0	51	19	37.3	317.40	45.80	13.80	5.15	44.1
P1PCBT	PCB, TOTAL	ug/kg	2	121.60	242.80	2	2	100.0	51	40	78.4	171.80	88.70	1.63	3.18	79.4
P1BHCA	ALPHA-BHC(HEXCHLORCYCLOHEXANE)	ug/kg	1	33.10	33.10	2	1	50.0	51	12	23.5	9.10	5.50	6.21	2.74	35.3
P1BHCG	GAMMA-BHC(HEXCHLORCYCLOHEXANE)	ug/kg	2	47.10	47.10	2	1	50.0	51	28	54.9	10.20	8.90	8.73	2.69	67.7
P1CHLA	ALPHA-CHLORDANE	ug/kg	1	6.20	6.20	2	1	50.0	51	18	35.3	3.70	5.90	2.08	2.38	47.1
P1CHLG	GAMMA-CHLORDANE	ug/kg	1	7.40	7.40	2	1	50.0	51	19	37.3	4.00	6.00	2.36	2.44	50.0
P1HEPE	HEPTACHLOREPOXIDE	ug/kg	2	32.30	32.30	2	1	50.0	51	12	23.5	8.40	5.00	6.68	2.62	32.4
P1PPDE	PP-DDE	ug/kg	1	13.60	13.60	2	1	50.0	51	22	43.1	5.50	7.30	3.63	2.31	52.9
P124D	2,4-DICHLOROPHENOXYACETIC ACID	ug/kg	3	128.00	128.00	2	1	50.0	51	38	74.5	25.30	93.20	9.90	6.50	82.3
X2124	1,2,4-TRICHLOROBENZENE	ug/kg	3	322.60	322.60	2	1	50.0	51	17	33.3	26.60	9.30	34.02	4.06	41.2

PLANT NAME : Guelph
PLANT TYPE : Secondary

SAMPLING TYPE : Raw Sludge
SAMPLE FORM : Dry Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS (DRY WEIGHT)	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
VOLATILE ORGANIC COMPOUNDS																
B2EBNZ	ETHYLBENZENE (C8H10)	ug/kg	1	24813.90	24813.90	2	1	50.0	51	10	19.6	3309.90	890.70	17.27	2.60	26.5
B2MPXY	M-, AND P-XYLENES	ug/kg	1	47146.40	47146.40	2	1	50.0	51	16	31.4	4562.40	1345.90	27.19	3.86	41.2
B2OXYL	O-XYLENE (C8H10)	ug/kg	1	7692.30	7692.30	2	1	50.0	51	8	15.7	1842.90	841.60	7.56	2.51	23.5
X1CHLO	CHLOROFORM (CHCL3)	ug/kg	1	7196.00	7196.00	2	1	50.0	51	12	23.5	1782.40	1225.10	7.20	4.24	35.3
X213CB	1,3-DICHLOROBENZENE	ug/kg	1	3970.20	3970.20	2	1	50.0	51	1	2.0	1323.90	635.50	4.73	1.91	2.9
X214CB	1,4-DICHLOROBENZENE	ug/kg	1	7692.30	7692.30	2	1	50.0	51	1	2.0	1842.90	643.70	7.54	2.00	2.9

PLANT NAME : Guelph — **SAMPLING TYPE : Treated Sludge**
PLANT TYPE : Secondary — **SAMPLE FORM : Dry Weight**

CONTAM-INANT	CONTAMINANT NAME	UNITS (DRY WEIGHT)	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
COD	CHEMICAL OXYGEN DEMAND	mg/kg	0	970873.79	970873.79	1	1	100.0	36	36	100.0	970873.79	508097.94	0.00	4.65	100.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/kg	0	22299.99	26399.99	2	2	100.0	49	49	100.0	24263.55	38494.12	1.13	1.77	100.0
PH	(-LOG(H+(CONCN))	mg/kg	0	7.00	7.40	2	2	100.0	47	47	100.0	7.20	7.17	1.04	1.09	100.0
PHENOL	PHENOLICS (4AAP)	mg/kg	0	6.80	109.20	2	2	100.0	49	41	83.7	27.24	43.05	7.12	3.14	87.9
PPUT	PHOSPHORUS,UNFILT.TOTAL.	mg/kg	0	34730.00	734320.00	2	2	100.0	43	43	100.0	159696.38	76638.67	8.65	6.91	100.0
RST	RESIDUE, TOTAL	mg/kg	0	174000.00	206000.00	2	2	100.0	50	50	100.0	189325.12	80434.06	1.13	3.23	100.0
RSTLOI	RESIDUE,TOT.LOSS ON IGNI.	mg/kg	0	93960.00	112888.00	2	2	100.0	50	50	100.0	102990.08	43379.33	1.14	3.19	100.0
METALS																
AGUT	SILVER,UNFILT.TOTAL.	mg/kg	0	27.30	27.30	1	1	100.0	44	44	100.0	27.30	37.78	0.00	2.33	100.0
ALUT	ALUMINUM,UNFILT.TOTAL.	mg/kg	0	3777.86	45977.01	2	2	100.0	50	50	100.0	13179.34	10715.94	5.85	2.82	100.0
ASUT	ARSENIC,UNFILT.TOTAL.	mg/kg	0	4.37	5.17	2	2	100.0	50	49	98.0	4.75	5.40	1.13	2.06	97.1
CDUT	CADMIUM,UNFILT.TOTAL.	mg/kg	0	11.84	103.45	2	2	100.0	45	41	91.1	35.00	10.47	4.63	3.98	90.3
COUT	COBALT,UNFILT.TOTAL.	mg/kg	0	10.34	10.34	1	1	100.0	39	32	82.1	10.34	9.14	0.00	2.75	85.7
CRUT	CHROMIUM,UNFILT.TOTAL.	mg/kg	0	210.10	2126.44	2	2	100.0	50	50	100.0	668.40	333.06	5.14	3.59	100.0
CUUT	COPPER,UNFILT.TOTAL.	mg/kg	0	110.87	977.01	2	2	100.0	45	45	100.0	329.13	732.24	4.66	2.16	100.0
HGUT	MERCURY,UNFILT.TOTAL.	mg/kg	0	7.77	10.34	2	2	100.0	50	49	98.0	8.96	3.24	1.22	2.04	97.1
MOUT	MOLYBDENUM,UNFILT.TOTAL.	mg/kg	0	1.32	1.32	1	1	100.0	34	23	67.7	1.32	6.41	0.00	2.84	69.2
NIUT	NICKEL,UNFILT.TOTAL.	mg/kg	0	6.26	57.47	2	2	100.0	45	42	93.3	18.97	72.95	4.79	2.95	90.0
PBUT	LEAD,UNFILT.TOTAL.	mg/kg	0	49.76	333.33	2	2	100.0	50	49	98.0	128.79	196.62	3.84	2.46	97.1
SEUT	SELENIUM,UNFILT.TOTAL.	mg/kg	0	2.43	2.87	2	2	100.0	50	48	96.0	2.64	2.67	1.13	2.98	97.1
SRUT	STRONTIUM,UNFILT.TOTAL.	mg/kg	0	83.54	747.13	2	2	100.0	50	50	100.0	249.84	240.93	4.71	2.54	100.0
ZNUT	ZINC,UNFILT.TOTAL.	mg/kg	0	625.97	9310.34	2	2	100.0	50	50	100.0	2414.13	988.90	6.75	2.57	100.0
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PMBBP	BUTYLBENZYLPHTHALATE	ug/kg	1	7281.60	32183.90	2	2	100.0	50	8	16.0	15308.50	1916.90	2.86	5.23	17.7
PMNNP	N-NITROSO-DI-NPROPYLAMINE	ug/kg	1	17475.70	17475.70	2	1	50.0	50	1	2.0	3169.10	1335.60	11.19	3.39	2.9
DIOXINS AND FURANS																
P96CDD	OCTACHLORODIBENZODIOXIN	ug/kg	1	3.80	3.80	2	1	50.0	49	26	53.1	6.10	7.10	1.96	3.86	64.7
PESTICIDES,HERBICIDES,PCBS																
P1PCBT	PCB, TOTAL	ug/kg	2	278.50	418.50	2	2	100.0	50	32	64.0	341.40	114.10	1.33	4.58	67.7
P1BHCA	ALPHA-BHC(HEXACHLORCYCLOHEXANE)	ug/kg	1	21.50	21.50	2	1	50.0	50	11	22.0	11.10	5.60	2.56	3.00	32.4
P1CHLA	ALPHA-CHLORDANE	ug/kg	1	18.40	18.40	2	1	50.0	50	22	44.0	9.50	6.50	2.55	2.41	55.9
P1CHLG	GAMMA-CHLORDANE	ug/kg	1	20.30	20.30	2	1	50.0	50	21	42.0	10.00	6.80	2.73	2.58	52.9
P1DIEL	DIELDRIN	ug/kg	2	384.20	384.20	2	1	50.0	50	15	30.0	43.40	6.50	21.85	3.51	38.2
P1DMDT	METHOXYCHLOR	ug/kg	1	251.80	251.80	2	1	50.0	50	15	30.0	78.20	34.10	5.22	4.42	38.2
P1END1	ENDOSULFAN I	ug/kg	3	66.30	66.30	2	1	50.0	50	6	12.0	17.80	4.90	6.17	2.96	11.8
P1END2	ENDOSULFAN II	ug/kg	3	27.50	27.50	2	1	50.0	50	7	14.0	11.60	4.70	3.39	2.67	20.6
P1ENDR	ENDRIN	ug/kg	3	23.00	23.00	2	1	50.0	50	5	10.0	10.60	4.20	2.98	2.36	14.7
P1ENDS	ENDOSULFAN SULPHATE	ug/kg	3	103.20	103.20	2	1	50.0	50	6	12.0	44.70	17.50	3.26	2.53	17.7
P1HEPE	HEPTACHLOREPOXIDE	ug/kg	2	242.70	242.70	2	1	50.0	50	10	20.0	34.50	5.20	15.79	2.86	23.5
P1HEPT	HEPTACHLOR	ug/kg	3	12.80	12.80	2	1	50.0	50	9	18.0	7.90	4.70	1.97	2.20	23.5

PLANT NAME : Guelph
PLANT TYPE : Secondary

SAMPLING TYPE : Treated Sludge
SAMPLE FORM : Dry Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS (DRY WEIGHT)	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
P1PPDE	PP-DDE	ug/kg	1	22.80	22.80	2	1	50.0	50	34	68.0	10.60	11.10	2.97	2.72	73.5
X1HCCP	HEXACHLOROCYCLOPENTADIENE	ug/kg	3	171.90	171.90	2	1	50.0	50	8	16.0	64.60	34.20	3.99	2.76	23.5
X2124	1,2,4-TRICHLOROBENZENE	ug/kg	3	306.50	306.50	2	1	50.0	50	22	44.0	54.50	14.80	11.49	5.02	52.9
VOLATILE ORGANIC COMPOUNDS																
B2ETBNZ	ETHYLBENZENE (C8H10)	ug/kg	1	6896.60	6896.60	2	1	50.0	50	14	28.0	818.30	606.50	20.38	5.59	32.4
B2MPXY	M-, AND P-XYLENES	ug/kg	1	14942.50	14942.50	2	1	50.0	50	15	30.0	1204.50	816.00	35.20	7.11	32.4
B2OXYL	O-XYLENE (C8H10)	ug/kg	1	3046.00	3046.00	2	1	50.0	50	14	28.0	543.80	523.50	11.43	4.05	32.4
X1CHLO	CHLOROFORM (CHCL3)	ug/kg	1	1666.70	1666.70	2	1	50.0	50	12	24.0	402.30	441.70	7.46	4.33	35.3
X14CB	1,4-DICHLOROBENZENE	ug/kg	1	2643.70	2643.70	2	1	50.0	50	2	4.0	506.70	272.70	10.34	3.28	5.9

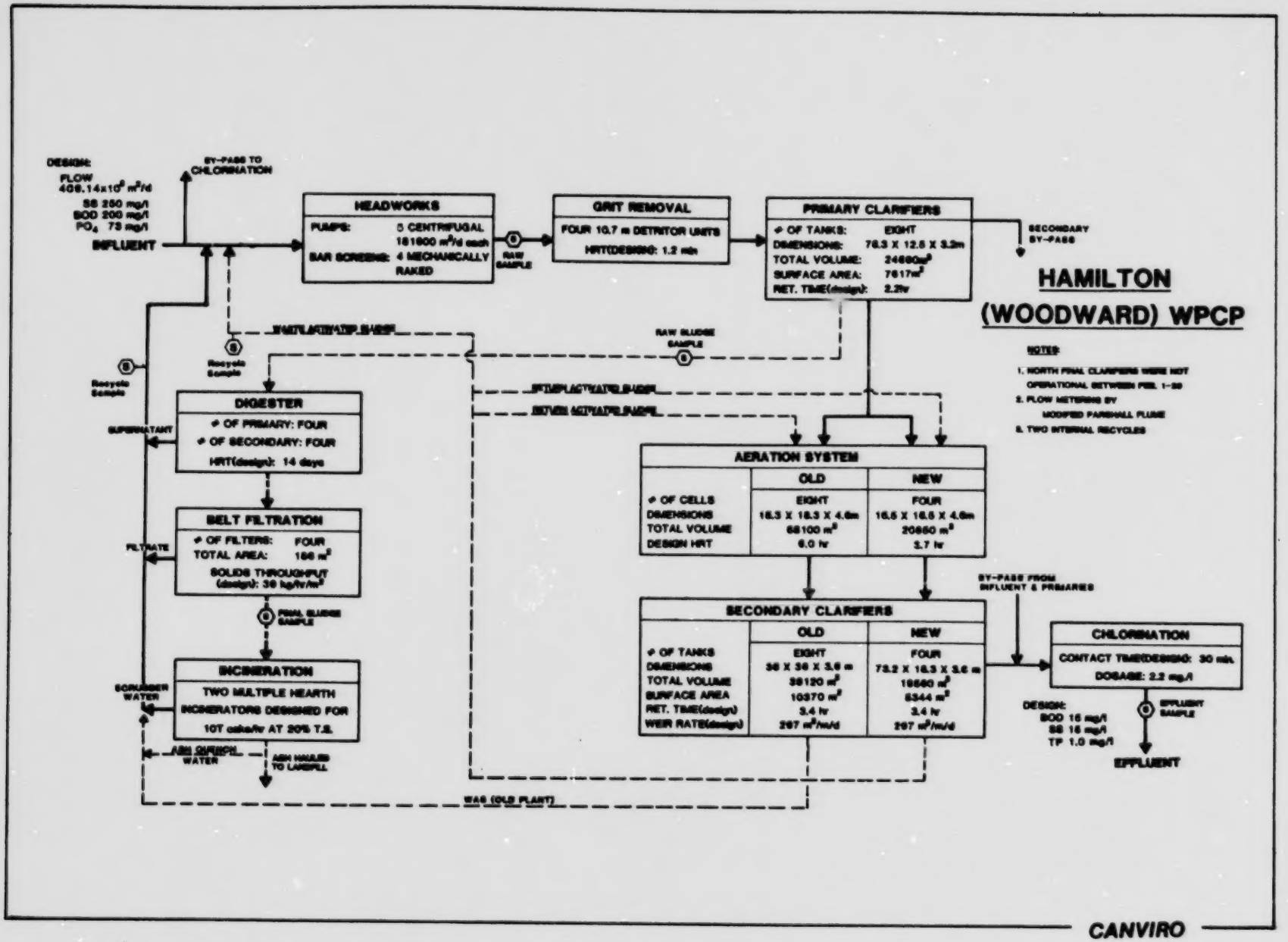
Sub-Appendix A-7

Hamilton (Woodward) WPCP

Contents:

- Plant Schematic with Design Characteristics
- Annual Data Review (1981 - 1986 Plant Performance)
- Sources of Municipal Water Pollution Control Plant Raw Sewage
- Operational Evaluation for Hamilton (Woodward) WPCP
- Analytical Data

(KIR18/28A)


DESIGN:
FLOW
408.14x10³ m³/d
SS 250 mg/l
BOD 200 mg/l
PO4 73 mg/l
INFLUENT
BY-PASS TO CHLORINATION
HEADWORKS
PUMPS: 5 CENTRIFUGAL 181600 m³/d each
BAR SCREENS: 4 MECHANICALLY RAKED
RAW SAMPLE
GRIT REMOVAL
FOUR 10.7 m DETRITOR UNITS
HRT(DESIGN): 1.2 min
PRIMARY CLARIFIERS
OF TANKS: EIGHT
DIMENSIONS: 76.3 X 12.8 X 3.2m
TOTAL VOLUME: 24660m³
SURFACE AREA: 7617m²
RET. TIME(design): 2.2hr
SECONDARY BY-PASS
HAMILTON
(WOODWARD) WPCP
NOTES:
1. NORTH FINAL CLARIFIERS WERE NOT OPERATIONAL BETWEEN FEB. 1-20
2. FLOW METERING BY MODIFIED PARSHALL FLUME
3. TWO INTERNAL RECYCLES
RAW SLUDGE SAMPLE
Recycle Sample
Recycle Sample
DIGESTER
OF PRIMARY: FOUR
OF SECONDARY: FOUR
HRT(design): 14 days
SUPERNATANT
AERATION SYSTEM
OLD
NEW
OF CELLS: EIGHT / FOUR
DIMENSIONS: 16.3 X 16.3 X 4.6m / 16.6 X 16.6 X 4.6m
TOTAL VOLUME: 68100 m³ / 20660 m³
DESIGN HRT: 6.0 hr / 2.7 hr
BELT FILTRATION
OF FILTERS: FOUR
TOTAL AREA: 186 m²
SOLIDS THROUGHPUT (design): 30 kg/hr/m²
FILTRATE
FINAL SLUDGE SAMPLE
BY-PASS FROM INFLUENT & PRIMARIES
SECONDARY CLARIFIERS
OLD
NEW
OF TANKS: EIGHT / FOUR
DIMENSIONS: 36 X 36 X 3.6 m / 73.2 X 16.3 X 3.6 m
TOTAL VOLUME: 38120 m³ / 19660 m³
SURFACE AREA: 10370 m² / 5344 m²
RET. TIME(design): 3.4 hr / 3.4 hr
WEIR RATE(design): 297 m³/m/d / 297 m³/m/d
CHLORINATION
CONTACT TIME(DESIGN): 30 min
DOSAGE: 2.2 mg/l
DESIGN:
BOD 15 mg/l
SS 15 mg/l
TP 1.0 mg/l
EFFLUENT SAMPLE
EFFLUENT
INCINERATION
TWO MULTIPLE HEARTH
INCINERATORS DESIGNED FOR
10T cake/hr AT 20% T.S.
SCRUBBER WATER
ASH DIFFICH. WATER
ASH HAULED TO LANDFILL
WAS (OLD PLANT)
CANVIRO

WOODWARD AVE. WPCP
Conventional Activated Sludge
Phosphorus Removal Without Chem.
Capacity - 409.14 10(3)m3/day

PARAMETER	1981	1982	1983	1984	1985	5 YEAR AVERAGE 81-85
Avg. Daily Flow (1000 m3/day)	264.12	290.84	287.76	323.48	308.26	294.73
BOD5 - Influent (mg/L)	221.50	148.80	104.30	132.69	156.83	152.82
BOD5 - Effluent (mg/L)	17.40	11.20	15.00	19.29	23.35	17.25
Annual BOD5 Significantly Different from Mean Annual Average BOD5?	I.D.	I.D.	I.D.	I.D.	I.D.	
TSS - Influent (mg/L)	426.90	329.30	202.00	295.63	302.04	311.17
TSS - Effluent (mg/L)	31.60	17.00	13.00	19.37	19.67	20.13
Annual TSS Significantly Different from Mean Annual Average TSS?	I.D.	I.D.	I.D.	I.D.	I.D.	
Total P - Influent (mg/L)	7.30	6.40	6.40	6.54	10.91	7.51
Total P - Effluent (mg/L)	2.24	1.15	1.10	1.27	1.31	1.41
Annual TP Significantly Different from Mean Annual Average TP?	I.D.	I.D.	I.D.	I.D.	I.D.	
TP in Compliance?	N	N	N	N	N	N

I.D. - Insufficient Data

R

SOURCES OF MUNICIPAL WATER POLLUTION CONTROL PLANT RAW SEWAGE

GENERAL DESCRIPTION OF WATER POLLUTION CONTROL PLANT (WPCP)

NAME OF WPCP	WOODWARD AVE. WPCP
WORKS NUMBER	120001504
TREATMENT TYPE	CONVENTIONAL ACTIVATED SLUDGE PHOSPHORUS REMOVAL W/O CHEMICALS
DESIGN CAPACITY (1000 m3/d)	409.140
1986 AVERAGE DAY FLOW (1000 m3/d)	306.696
POPULATION SERVED	300000

% OF TOTAL FLOW ATTRIBUTED TO:

INDUSTRIAL SOURCES (%)	10
COMMERCIAL SOURCES (%) (Population x 0.0757)	7
RESIDENTIAL SOURCES (%) (Population x 0.175)	17
UNACCOUNTED FOR, INCL. INFILTRATION (100-% Contributed from industrial, commercial and residential sources)	65

PROFILE OF INDUSTRIES IN CATCHMENT

TOTAL NO OF INDUSTRIES	608
INDUSTRIES WITH WATER	306
NO OF SIC CATEGORIES	56

DESCRIPTION OF THE TOP 5 INDUSTRIES DISCHARGED TO THE WPCP (BASED ON WATER USE DATA)

DESCRIPTION	SIC	# OF COMPANIES
IRON AND STEEL	3300-3317	10
ELECTRICAL/ELECTRONIC CMPNT	3612-3690	17
METAL FINISHING	3411-3469	71
RUBBER MFG AND PROCESSING	3011-3069	5
COIL COATING	3479-3479	2

OPERATIONAL EVALUATION FOR: H A M I L T O N W P C P

TREATMENT FACILITY: Secondary
PERIOD ENDING: February 27, 1987
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: 409,140 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
RAW SEWAGE FLOW	318,681	306,861	297,314	289,131	284,131	280,494	256,854
% of Design Flow	77.89%	75.00%	72.67%	70.67%	69.45%	68.56%	62.78%
Influent BOD (mg/L)	271.0	314.0	335.0	306.0	253.0	299.0	326.0
Primary BOD (mg/L)	111.0	141.0	136.0	96.0	123.0	119.0	132.0
Secondary BOD (mg/L)	25.0	28.0	24.0	14.0	13.0	32.0	42.0
% PRIMARY REMOVAL	59.0%	55.1%	59.4%	68.6%	51.4%	60.2%	59.5%
% SECONDARY REMOVAL	90.8%	91.1%	92.8%	95.4%	94.9%	89.3%	87.1%
Influent SS (mg/L)	514.0	492.0	752.0	953.0	752.0	846.0	1168.0
Primary SS (mg/L)	100.0	101.0	104.0	86.0	106.0	92.0	64.0
Secondary SS (mg/L)	12.0	12.0	6.0	8.0	9.0	8.0	7.0
% PRIMARY REMOVAL	80.5%	79.5%	86.2%	91.0%	85.9%	89.1%	94.5%
% SECONDARY REMOVAL	97.7%	97.6%	99.2%	99.2%	98.8%	99.1%	99.4%
Influent NH4 (mg/L)							
Primary NH4 (mg/L)				17.0			
Secondary NH4 (mg/L)				18.0			
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)				18.0			
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)	8.00	12.80	8.80	10.80	9.00	9.30	9.30
Primary Total P (mg/L)							
Secondary Total P (mg/L)	0.80	1.00	0.60	0.70	0.70	1.30	0.70
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	90.0%	92.2%	93.2%	93.5%	92.2%	86.0%	92.5%

OPERATIONAL EVALUATION FOR: H A M I L T O N W P C P

TREATMENT FACILITY: Secondary
PERIOD ENDING: February 27, 1987
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: 409,140 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 8	DAY 9	DAY 10	DAY 11	DAY 12	DAY 13	DAY 14
RAW SEWAGE FLOW	279,585	278,221	290,495	290,950	283,676	277,312	273,220
% of Design Flow	68.33%	68.00%	71.00%	71.11%	69.33%	67.78%	66.78%
Influent BOD (mg/L)	258.0	336.0	337.0	200.0	271.0	180.0	181.0
Primary BOD (mg/L)	122.0	158.0	172.0	64.0	63.0	69.0	46.0
Secondary BOD (mg/L)	31.0	36.0	35.0	5.0	8.0	7.0	7.0
% PRIMARY REMOVAL	52.7%	53.0%	49.0%	68.0%	76.8%	61.7%	74.6%
% SECONDARY REMOVAL	88.0%	89.3%	89.6%	97.5%	97.0%	96.1%	96.1%
Influent SS (mg/L)	1119.0	619.0	546.0	528.0	996.0	468.0	651.0
Primary SS (mg/L)	81.0	121.0	120.0	79.0	77.0	87.0	95.0
Secondary SS (mg/L)	9.0	8.0	9.0	8.0	7.0	6.0	11.0
% PRIMARY REMOVAL	92.8%	80.5%	78.0%	85.0%	92.3%	81.4%	85.4%
% SECONDARY REMOVAL	99.2%	98.7%	98.4%	98.5%	99.3%	98.7%	98.3%
Influent NH4 (mg/L)							
Primary NH4 (mg/L)				18.0			
Secondary NH4 (mg/L)				16.0			
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)				17.0			
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)	10.10	9.30	9.60	9.00	12.20	9.90	9.00
Primary Total P (mg/L)							
Secondary Total P (mg/L)	0.90	1.10	0.50	0.50	0.80	0.80	1.00
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	91.1%	88.2%	94.8%	94.4%	93.4%	91.9%	88.9%

OPERATIONAL EVALUATION FOR: HAMILTON WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: February 27, 1987
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: 409,140 m3/d

PARAMETER	SAMPLING PERIOD						
	DAY 15	DAY 16	DAY 17	DAY 18	DAY 19	DAY 20	DAY 21
RAW SEWAGE FLOW	280,484	283,676	276,857	275,493	249,126		
% of Design Flow	68.55%	69.33%	67.67%	67.33%	60.89%		
Influent BOD (mg/L)	351.0	334.0	289.0	281.0	229.0		
Primary BOD (mg/L)	63.0	59.0	63.0	71.0	90.0		
Secondary BOD (mg/L)	7.0	8.0	4.0	10.0	8.0		
% PRIMARY REMOVAL	82.1%	82.3%	78.2%	74.7%	60.7%		
% SECONDARY REMOVAL	98.0%	97.6%	98.6%	96.4%	96.5%		
Influent SS (mg/L)	1027.0	1127.0	871.0	711.0	579.0		
Primary SS (mg/L)	104.0	95.0	96.0	88.0	94.0		
Secondary SS (mg/L)	10.0	10.0	7.0	5.0	8.0		
% PRIMARY REMOVAL	89.9%	91.6%	89.0%	87.6%	83.8%		
% SECONDARY REMOVAL	99.0%	99.1%	99.2%	99.3%	98.6%		
Influent NH4 (mg/L)							
Primary NH4 (mg/L)				17.0			
Secondary NH4 (mg/L)				16.0			
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)				18.0			
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)	9.60	11.70	11.70	10.20	7.40		
Primary Total P (mg/L)							
Secondary Total P (mg/L)	1.00	0.70	0.40	0.50	0.70		
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	89.6%	94.0%	96.6%	95.1%	90.5%		

OPERATIONAL EVALUATION FOR: H A M I L T O N W P C P

TREATMENT FACILITY: Secondary
PERIOD ENDING: July 3, 1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 409,140 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
RAW SEWAGE FLOW	282,312	290,041	291,859	282,767	286,404	255,945	260,946
% of Design Flow	69.00%	70.89%	71.33%	69.11%	70.00%	62.56%	63.78%
Influent BOD (mg/L)	209.0	233.0	227.0	240.0	259.0		
Primary BOD (mg/L)	146.0	154.0	178.0	199.0	161.0		
Secondary BOD (mg/L)	60.0	58.0	60.0	58.0	62.0		
% PRIMARY REMOVAL	30.1%	33.9%	21.6%	17.1%	37.8%		
% SECONDARY REMOVAL	71.3%	75.1%	73.6%	75.8%	76.1%		
Influent SS (mg/L)	319.0	237.0	314.0	334.0	374.0	435.0	288.0
Primary SS (mg/L)	79.0	75.0	72.0	57.0	85.0	68.0	72.0
Secondary SS (mg/L)	10.0	11.0	10.0	10.0	9.0	11.0	9.0
% PRIMARY REMOVAL	75.2%	68.4%	77.1%	82.9%	77.3%	84.4%	75.0%
% SECONDARY REMOVAL	96.9%	95.4%	96.8%	97.0%	97.6%	97.5%	96.9%
Influent NH4 (mg/L)							
Primary NH4 (mg/L)	22.0						
Secondary NH4 (mg/L)	22.0						
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)	22.0						
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)	7.50	5.90	7.70	7.70	9.30	8.00	8.80
Primary Total P (mg/L)							
Secondary Total P (mg/L)	1.00	1.40	1.60	1.40	0.80	1.00	1.20
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	86.7%	76.3%	79.2%	81.8%	91.4%	87.5%	86.4%

OPERATIONAL EVALUATION FOR: HAMILTON WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: July 3, 1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 409,140 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 8	DAY 9	DAY 10	DAY 11	DAY 12	DAY 13	DAY 14
RAW SEWAGE FLOW	515,981	412,331	347,776	331,865	431,879	350,958	289,586
% of Design Flow	126.11%	100.78%	85.00%	81.11%	105.56%	85.78%	70.78%
Influent BOD (mg/L)							
Primary BOD (mg/L)							
Secondary BOD (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent SS (mg/L)	285.0	193.0	278.0	217.0	296.0	219.0	183.0
Primary SS (mg/L)	149.0	97.0	91.0	84.0	138.0	87.0	51.0
Secondary SS (mg/L)	10.0	9.0	11.0	9.0	10.0	7.0	10.0
% PRIMARY REMOVAL	47.7%	49.7%	67.3%	61.3%	53.4%	60.3%	72.1%
% SECONDARY REMOVAL	96.5%	95.3%	96.0%	95.9%	96.6%	96.8%	94.5%
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)	5.80	4.30	6.80	6.90	6.90	5.10	4.40
Primary Total P (mg/L)							
Secondary Total P (mg/L)	1.10	0.90	1.40	0.90	0.70	0.70	0.80
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	81.0%	79.1%	79.4%	87.0%	89.9%	86.3%	81.8%

OPERATIONAL EVALUATION FOR: H A M I L T O N W P C P

TREATMENT FACILITY: Secondary
PERIOD ENDING: July 3, 1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 409,140 m3/d

PARAMETER	SAMPLING PERIOD DAY 15	DAY 16	DAY 17	DAY 18	DAY 19	DAY 20	DAY 21
RAW SEWAGE FLOW	300,497	275,948	288,677	353,231	287,313		
% of Design Flow	73.45%	67.45%	70.56%	86.33%	70.22%		
Influent BOD (mg/L)							
Primary BOD (mg/L)							
Secondary BOD (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent SS (mg/L)	207.0	198.0	262.0	358.0	389.0		
Primary SS (mg/L)	86.0	79.0	69.0	46.0	79.0		
Secondary SS (mg/L)	6.0	7.0	3.0	6.0	5.0		
% PRIMARY REMOVAL	58.5%	60.1%	73.7%	87.2%	79.7%		
% SECONDARY REMOVAL	97.1%	96.5%	98.9%	98.3%	98.7%		
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)	4.40	4.90	4.70	5.80	7.10		
Primary Total P (mg/L)							
Secondary Total P (mg/L)	1.30	1.40	1.20	1.00	0.50		
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	70.5%	71.4%	74.5%	82.8%	93.0%		

PLANT NAME : Hamilton (Woodward)
PLANT TYPE : Secondary

SAMPLING TYPE : Raw Sewage
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0	102.00	178.00	10	10	100.0	267	266	99.6	140.66	140.23	1.20	1.93	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0	272.00	408.00	7	7	100.0	260	258	99.2	331.82	287.75	1.17	1.82	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0	10.50	14.00	10	10	100.0	271	271	100.0	12.07	22.39	1.09	1.81	100.0
NNHTFR	AMMONIUM,TOTAL FIL.T.REAC.	mg/L	0	11.90	19.20	10	10	100.0	275	274	99.6	16.60	15.37	1.15	1.69	100.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0	25.00	35.00	10	10	100.0	273	273	100.0	28.24	25.44	1.10	1.47	100.0
PH	(-LOG(H+(CONCN))		0	6.80	7.02	10	10	100.0	275	275	100.0	6.92	6.90	1.01	1.05	100.0
PPUT	PHOSPHORUS,UNFIL.T.TOTAL	mg/L	0	4.22	10.30	11	11	100.0	248	248	100.0	6.29	5.18	1.25	1.51	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0	176.00	353.00	10	10	100.0	267	266	99.6	232.12	126.88	1.25	1.93	100.0
RSPLOI	RESIDUE,PAR.LOSS ON IGNI.	mg/L	0	106.00	210.00	5	5	100.0	90	89	98.9	142.69	100.84	1.30	1.78	100.0
NNO2FR	NITRITE,FIL.T. REACT.	mg/L	0	0.03	0.08	10	5	50.0	271	58	21.4	0.01	0.01	4.89	2.98	51.4
PHNOL	PHENOLICS (4AAP)	mg/L	0	0.59	2.70	10	5	50.0	275	37	13.5	0.46	0.31	2.17	2.05	37.8
NNOTFR	NITRATES,TOTAL FIL.T.REAC.	mg/L	0	0.25	0.30	10	3	30.0	275	28	10.2	0.08	0.05	2.78	2.33	32.4
METALS																
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	1000.00	11000.00	11	11	100.0	322	306	95.0	2470.00	1000.10	1.84	2.65	97.3
CCNFUR	CYANIDE-FREE,UNFILT.REAC.	ug/L	0	10.00	60.00	10	10	100.0	271	82	30.3	20.00	1.90	1.79	6.88	32.4
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	70.00	820.00	11	11	100.0	322	237	73.6	170.00	51.10	1.92	3.44	89.2
CUUT	COPPER,UNFILT.TOTAL	ug/L	0	160.00	180.00	2	2	100.0	49	48	98.0	170.00	110.60	1.09	2.28	97.1
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	0.20	0.58	10	10	100.0	283	274	96.8	0.32	0.23	1.34	2.11	100.0
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	350.00	690.00	11	11	100.0	319	318	99.7	430.00	370.70	1.21	2.14	100.0
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	440.00	2100.00	11	11	100.0	322	315	97.8	620.00	211.00	1.58	2.94	100.0
AGUT	SILVER,UNFILT.TOTAL	ug/L	0	10.00	40.00	12	6	50.0	321	82	25.6	10.00	10.40	2.32	2.55	75.7
CDUT	CADMIUM,UNFILT.TOTAL	ug/L	0	10.00	60.00	11	5	45.5	322	76	23.6	10.00	6.50	2.35	2.09	70.3
NIUT	NICKEL,UNFILT.TOTAL	ug/L	0	50.00	180.00	11	5	45.5	322	103	32.0	40.00	38.80	1.98	2.70	54.1
PBUT	LEAD,UNFILT.TOTAL	ug/L	0	100.00	430.00	11	5	45.5	322	57	17.7	90.00	59.50	2.20	1.86	51.4
MOUT	MOLYBDENUM,UNFILT.TOTAL	ug/L	0	60.00	70.00	12	2	16.7	321	41	12.8	20.00	12.40	2.10	1.72	56.8
COUT	COBALT,UNFILT.TOTAL	ug/L	0	10.00	10.00	11	1	9.1	322	82	25.5	10.00	9.30	1.38	2.31	83.8
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PNFLAN	FLUORANTHENE	ug/L	1	2.40	18.20	10	3	30.0	275	4	1.5	5.68	5.09	1.71	1.29	5.4
PNMCRE	M-CRESOL	ug/L	1	40.10	72.60	10	2	20.0	275	167	60.7	9.47	25.59	2.87	3.45	86.5
PNBBFA	BENZO(B)FLUORANTHENE	ug/L	1	14.00	14.00	10	1	10.0	275	1	0.4	4.72	5.01	1.89	1.27	2.7
PNPHEN	PHENANTHRENE	ug/L	1	2.20	2.20	10	1	10.0	275	7	2.6	4.61	5.17	1.30	1.35	10.8
PESTICIDES,HERBICIDES,PCBS																
P24D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	0.06	1.70	10	10	100.0	276	214	77.5	0.27	0.13	3.00	3.72	100.0
P1BHCG	GAMMA-BHC(HEXACHLORCYCLOHEXANE)	ug/L	2	0.02	0.10	10	7	70.0	276	143	51.8	0.03	0.02	2.40	2.29	94.6
X2124	1,2,4-TRICHLOROBENZENE	ug/L	3	0.04	0.45	10	6	60.0	276	35	12.7	0.04	0.01	3.65	2.48	40.5
P1PCBT	PCB, TOTAL	ug/L	2	0.36	1.20	10	5	50.0	276	42	15.2	0.16	0.06	4.60	2.31	46.0
P245T	2,4,5-TRICLORPHENOXYACETIC ACID	ug/L	3	0.12	0.25	10	4	40.0	276	22	8.0	0.09	0.06	2.05	1.60	37.8
P5SILV	SILVEX	ug/L	3	0.10	0.36	10	3	30.0	276	28	10.1	0.07	0.06	1.92	1.68	40.5
P1HEPT	HEPTACHLOR	ug/L	3	0.03	0.04	10	2	20.0	276	10	3.6	0.01	0.01	1.70	1.48	18.9
P1MIRX	MIREX	ug/L	1	0.02	0.03	10	2	20.0	276	6	2.2	0.01	0.01	1.48	1.28	10.8
P1DMDT	METHOXYCHLOR	ug/L	1	0.25	0.25	10	1	10.0	276	47	17.0	0.06	0.08	1.66	3.14	43.2
VOLATILES ORGANIC COMPOUNDS																
X1TETR	TETRACHLOROETHYLENE	ug/L	1	29.00	29.00	10	1	10.0	274	12	4.4	20.76	21.51	1.12	1.53	18.9

PLANT NAME : Hamilton (Woodward)
PLANT TYPE : Secondary

SAMPLING TYPE : Final Effluent
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	STD. FOR SURFACE WATER	STD. REF.	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET.	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																		
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0		-	6.80	61.40	9	9	100.0	213	211	99.1	19.75	21.22	2.14	2.07	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0		-	22.00	58.00	7	7	100.0	213	211	99.1	33.36	52.80	1.37	1.83	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0		-	4.80	7.10	10	10	100.0	220	220	100.0	5.70	8.09	1.14	1.60	100.0
NNHTPR	AMMONIUM,TOTAL PILT.REAC.	mg/L	0		-	12.60	19.10	10	10	100.0	223	204	91.5	14.73	3.90	1.16	6.98	100.0
NNO2PR	NITRITE,FILT. REACT.	mg/L	0		-	0.03	1.27	10	10	100.0	220	194	88.2	0.38	0.22	3.62	5.95	96.4
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0		-	13.50	20.40	9	9	100.0	222	222	100.0	16.63	7.97	1.13	2.71	100.0
PH	(-LOG(H+(CONCN))		0		-	6.42	7.43	10	10	100.0	224	224	100.0	7.10	7.10	1.05	1.05	100.0
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/L	0		-	0.26	1.52	10	10	100.0	211	206	97.6	0.73	0.68	1.75	1.97	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0		-	4.20	14.40	10	10	100.0	220	219	99.6	6.92	10.12	1.47	2.00	100.0
NNOTPR	NITRATES,TOTAL FILT.REAC.	mg/L	0		-	0.50	4.40	10	8	80.0	224	186	83.0	0.81	2.33	3.82	7.75	96.4
RSFLOI	RESIDUE,PAR.LOSS ON IGNI.	mg/L	0		-	5.20	5.20	5	1	20.0	77	58	75.3	2.39	7.47	1.36	2.71	93.3
PHENOL	PHENOLICS (4AAP)	mg/L	0	0.00	ONT-MOE	0.11	0.11	10	1	10.0	225	33	14.7	0.05	0.07	1.28	1.86	53.6
METALS																		
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	0.20	ONT-MOE	0.02	0.15	10	10	100.0	233	220	94.4	0.03	0.03	1.91	2.62	100.0
NIUT	NICKEL,UNFILT.TOTAL	ug/L	0	25.00	ONT-MOE	20.00	60.00	12	12	100.0	267	171	64.0	40.00	22.10	1.36	3.60	85.7
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	3750.00	ONT-MOE	290.00	430.00	12	12	100.0	267	267	100.0	350.00	340.90	1.10	2.14	100.0
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	30.00	ONT-MOE	30.00	60.00	12	12	100.0	267	262	98.1	50.00	53.30	1.23	2.48	100.0
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	75.00	ONT-MOE	80.00	140.00	12	9	75.0	264	196	74.2	60.00	101.70	2.97	3.72	96.4
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	100.00	ONT-MOE	10.00	20.00	12	9	75.0	267	137	51.3	10.00	9.00	1.45	2.00	89.3
MOUT	MOLYBDENUM,UNFILT.TOTAL	ug/L	0		-	10.00	20.00	12	7	58.3	267	75	28.1	10.00	6.60	1.57	1.56	67.9
CDUT	CADMIUM,UNFILT.TOTAL	ug/L	0	0.20	ONT-MOE	0.00	0.00	12	4	33.3	267	65	24.3	0.00	2.10	1.58	2.07	71.4
COUT	COBALT,UNFILT.TOTAL	ug/L	0	5.00	NYS-STD	10.00	10.00	12	1	8.3	266	65	24.4	10.00	6.40	1.22	1.54	82.1
PBUT	LEAD,UNFILT.TOTAL	ug/L	0	25.00	ONT-MOE	70.00	70.00	12	1	8.3	267	25	9.4	20.00	16.50	1.63	1.48	60.7
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																		
PNONITB	NITROBENZENE	ug/L	1	10.00	ONT-MOE	4.90	4.90	10	1	10.0	228	4	1.8	1.86	1.09	4.42	1.54	14.3
PESTICIDES,HERBICIDES,PCBS																		
P1BHCG	GAMMA-BHC(HEXCHLORCYCLHEXANE)	ug/L	2	0.06	ONT-MOE	0.01	0.08	10	8	80.0	227	157	69.2	0.02	0.02	2.86	2.48	96.4
P324D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	4.00	ONT-MOE	0.03	1.30	10	8	80.0	227	177	78.0	0.08	0.08	3.45	4.71	100.0
X2124	1,2,4-TRICHLOROBENZENE	ug/L	3	0.50	ONT-MOE	0.02	0.03	10	5	50.0	227	36	15.9	0.01	0.01	2.39	2.44	32.1
P1BHCA	ALPHA-BHC(HEXCHLORCYCLHEXANE)	ug/L	1	0.00	NYS-GUL	0.01	0.01	10	1	10.0	227	5	2.2	0.01	0.01	1.25	1.24	14.3
P1BHCB	BETA-BHC (HEXCHLORCYCLHEXANE)	ug/L	1	0.01	ONT-MOE	0.02	0.02	10	1	10.0	227	9	4.0	0.01	0.01	1.55	1.38	21.4
P1DMDT	METHOXYCHLOR	ug/L	1	0.04	ONT-MOE	0.10	0.10	10	1	10.0	227	31	13.7	0.03	0.04	1.55	2.72	35.7
P1PCBT	PCB, TOTAL	ug/L	2	0.00	ONT-MOE	0.08	0.08	10	1	10.0	227	9	4.0	0.02	0.02	1.55	1.40	28.6
P245T	2,4,5-TRICLORPHENOXYACETIC ACID	ug/L	3		-	0.46	0.46	10	1	10.0	227	25	11.0	0.03	0.03	2.51	2.27	42.9
P85IL	SILVEX	ug/L	3		-	0.30	0.30	10	1	10.0	227	23	10.1	0.03	0.03	2.19	1.83	50.0
VOLATILES ORGANIC COMPOUNDS																		
X1TETR	TETRACHLOROETHYLENE	ug/L	1	0.70	NYS-GUL	2.40	4.10	10	2	20.0	224	18	8.0	1.26	1.18	1.65	1.93	32.1
X1CHLO	CHLOROFORM	ug/L	1	0.20	NYS-STD	2.90	2.90	10	1	10.0	224	37	16.5	1.11	1.37	1.40	2.18	64.3

PLANT NAME : Hamilton (Woodward)
PLANT TYPE : Secondary

SAMPLING TYPE : Recycle
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0	274.00	750.00	6	6	100.0	20	20	100.0	492.45	905.21	1.48	2.32	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0	1110.00	3340.00	7	7	100.0	39	39	100.0	2170.77	3439.26	1.41	4.55	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0	12.30	21.00	10	10	100.0	42	42	100.0	15.36	77.62	1.20	3.54	100.0
NNHTPR	AMMONIUM,TOTAL FIL.T.REAC.	mg/L	0	52.50	88.80	10	10	100.0	44	44	100.0	68.71	146.20	1.16	2.07	100.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0	114.00	245.00	10	10	100.0	42	42	100.0	169.58	324.28	1.24	1.95	100.0
PH	(-LOG(H+(CONCN))		0	5.90	7.44	10	10	100.0	44	44	100.0	6.99	6.94	1.06	1.05	100.0
PPUT	PHOSPHORUS,UNFIL.T.TOTAL	mg/L	0	34.60	91.50	11	11	100.0	43	43	100.0	58.01	53.83	1.36	4.47	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0	1170.00	3580.00	10	10	100.0	42	42	100.0	2053.72	2242.77	1.40	3.60	100.0
RSPLOI	RESIDUE,PAR.LOSS ON IGNI.	mg/L	0	1040.00	1860.00	5	5	100.0	13	13	100.0	1337.76	1312.86	1.24	2.47	100.0
TURB	TURBIDITY	mg/L	0	3.60	3.60	1	1	100.0	1	1	100.0	3.60	3.60	0.00	0.00	100.0
NNO2PR	NITRITE,FIL.T. REACT.	mg/L	0	0.04	0.09	10	8	80.0	42	36	85.7	0.03	0.05	3.57	3.13	100.0
NNOTPR	NITRATES,TOTAL FIL.T.REAC.	mg/L	0	0.25	0.35	10	7	70.0	44	39	88.6	0.17	0.41	2.77	2.66	100.0
PHNOL	PHENOLICS (4AAP)	mg/L	0	0.70	0.70	10	1	10.0	44	11	25.0	0.20	0.41	2.23	3.16	55.6
METALS																
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	2600.00	37000.00	12	12	100.0	53	53	100.0	18700.00	28798.20	1.94	4.42	100.0
CAUT	CALCIUM,UNFILT.TOTAL	ug/L	0	82000.00	220000.00	12	12	100.0	54	54	100.0	158650.00	208447.60	1.28	1.87	100.0
CDUT	CADMIUM,UNFILT.TOTAL	ug/L	0	20.00	120.00	12	12	100.0	53	37	69.8	50.00	58.40	2.02	6.63	77.8
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	310.00	2700.00	12	12	100.0	53	51	96.2	1590.00	874.70	1.75	6.11	100.0
CUUT	COPPER,UNFILT.TOTAL	ug/L	0	1190.00	1500.00	2	2	100.0	12	12	100.0	1340.00	1814.00	1.18	5.64	100.0
FEUT	IRON,UNFILT.TOTAL	ug/L	0	16000.00	250000.00	12	12	100.0	53	53	100.0	121100.00	109943.30	2.00	4.19	100.0
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	0.42	2.90	10	10	100.0	47	44	93.6	1.21	1.68	2.19	4.49	100.0
MGUT	MAGNESIUM,UNFILT.TOTAL	ug/L	0	18000.00	46000.00	12	12	100.0	54	54	100.0	34650.00	41620.20	1.29	1.78	100.0
NIUT	NICKEL,UNFILT.TOTAL	ug/L	0	60.00	400.00	12	12	100.0	53	41	77.4	220.00	308.60	1.64	3.08	88.9
SEUT	SELENIUM,UNFILT.TOTAL	ug/L	0	110.00	240.00	11	11	100.0	51	25	49.0	150.00	44.20	1.34	3.52	55.6
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	420.00	1300.00	12	12	100.0	53	53	100.0	910.00	1347.00	1.33	2.13	100.0
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	490.00	8500.00	12	12	100.0	53	53	100.0	3940.00	3112.40	2.05	7.41	100.0
AGUT	SILVER,UNFILT.TOTAL	ug/L	0	30.00	130.00	12	11	91.7	53	42	79.3	70.00	72.30	1.54	4.09	100.0
PBUT	LEAD,UNFILT.TOTAL	ug/L	0	470.00	1200.00	12	11	91.7	53	36	67.9	600.00	429.50	2.31	6.62	100.0
ASUT	ARSENIC,UNFILT.TOTAL	ug/L	0	30.00	70.00	11	10	90.9	51	27	52.9	40.00	37.50	1.57	2.92	66.7
CCNPUR	CYANIDE-PRE,UNFILT.REAC.	ug/L	0	10.00	170.00	10	9	90.0	43	17	39.5	30.00	4.00	5.36	5.19	66.7
COUT	COBALT,UNFILT.TOTAL	ug/L	0	10.00	110.00	12	8	66.7	53	21	39.6	20.00	23.60	2.77	4.63	88.9
MOUT	MOLYBDENUM,UNFILT.TOTAL	ug/L	0	20.00	90.00	12	6	50.0	54	18	33.3	20.00	35.60	2.41	4.15	77.8
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PMMCRE	M-CRESOL	ug/L	1	274.00	274.00	10	1	10.0	43	27	62.8	159.32	562.69	1.21	5.65	88.9
PESTICIDES,HERBICIDES,PCBS																
P1PCBT	PCB, TOTAL	ug/L	2	1.60	6.60	10	7	70.0	44	27	61.4	1.60	0.77	4.03	7.58	77.8
P324D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	1.20	35.00	10	6	60.0	44	29	65.9	1.39	0.79	6.75	5.21	88.9
X2124	1,2,4-TRICHLOROBENZENE	ug/L	3	0.05	0.78	10	6	60.0	44	15	34.1	0.22	0.11	2.75	4.17	44.4
P1BHCA	ALPHA-BHC(HEXCHLORCYCLHEXANE)	ug/L	1	0.04	0.09	10	5	50.0	44	7	15.9	0.08	0.06	1.41	2.50	33.3
P1BHCB	BETA-BHC (HEXCHLORCYCLHEXANE)	ug/L	1	0.08	0.20	10	5	50.0	44	10	22.7	0.11	0.08	1.29	2.84	55.6
P1BHCG	GAMMA-BHC(HEXCHLORCYCLHEXANE)	ug/L	2	0.05	0.11	10	5	50.0	44	17	38.6	0.09	0.08	1.26	2.57	66.7
P5SILV	SILVEX	ug/L	3	0.64	3.60	10	5	50.0	44	15	34.1	1.03	0.38	2.44	5.08	66.7
P1CHLG	GAMMA-CHLORDANE	ug/L	1	0.02	0.04	10	4	40.0	44	11	25.0	0.05	0.06	2.38	2.70	44.4
P1DMDT	METHOXYCHLOR	ug/L	1	0.10	0.20	10	4	40.0	44	7	15.9	0.26	0.32	2.26	2.82	44.4
P1PPDE	PP-DDE	ug/L	1	0.02	0.07	10	4	40.0	44	17	38.6	0.05	0.07	2.30	3.59	55.6

PLANT NAME : Hamilton (Woodward)
PLANT TYPE : Secondary

SAMPLING TYPE : Recycle
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
PESTICIDES,HERBICIDES,PCBS																
P245T	2,4,5-TRICLORPHENOXYACETIC ACID	ug/L	5	0.83	6.00	10	4	40.0	44	18	40.9	1.02	0.43	2.87	4.50	77.8
P1CHLA	ALPHA-CHLORDANE	ug/L	1	0.03	0.05	10	3	30.0	44	11	25.0	0.05	0.06	2.55	2.96	55.6
P1DIEL	DIELDRIN	ug/L	2	0.02	0.06	10	3	30.0	44	7	15.9	0.05	0.06	2.63	2.81	55.6
P1HEPT	HEPTACHLOR	ug/L	3	0.02	0.04	10	3	30.0	44	9	20.5	0.04	0.07	2.65	3.83	44.4
P1PPDD	PP-DDD	ug/L	1	0.02	0.02	10	3	30.0	44	10	22.7	0.04	0.05	2.79	2.86	66.7
P1PPDT	PP-DDT	ug/L	3	0.10	0.21	10	3	30.0	44	3	6.8	0.18	0.21	2.60	2.74	11.1
P1ALDR	ALDRIN	ug/L	1	0.02	0.06	10	2	20.0	44	6	13.6	0.04	0.06	2.96	3.46	33.3
P1OCHL	OXYCHLORDANE	ug/L	2	0.05	0.05	10	2	20.0	44	4	9.1	0.04	0.05	2.87	2.96	22.2
X1HCCP	HEXACHLOROCYCLOPENTADIENE	ug/L	3	0.16	0.20	10	2	20.0	44	6	13.6	0.36	0.48	3.04	3.21	44.4
X2HCB	HEXACHLOROBENZENE	ug/L	2	0.03	0.03	10	2	20.0	44	12	27.3	0.04	0.07	2.89	4.31	66.7
P1BHCD	DELTA-BHC(HEXCHLORCYCLHEXANE)	ug/L	1	0.02	0.02	10	1	10.0	44	1	2.3	0.03	0.05	3.19	2.91	11.1

PLANT NAME : Hamilton (Woodward) **SAMPLING TYPE : Raw Sludge**
PLANT TYPE : Secondary **SAMPLE FORM : Dry Weight**

CONTAM-INANT	CONTAMINANT NAME	UNITS	QA/QC (DRY WEIGHT)	CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																	
COD	CHEMICAL OXYGEN DEMAND	mg/kg		0	797979.80	1606060.61	2	2	100.0	45	45	100.0	1132079.47	892221.45	1.64	3.19	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/kg		0	60606.06	60606.06	1	1	100.0	1	1	100.0	60606.06	60606.06	0.00	0.00	100.0
NNHTPR	AMMONIUM,TOTAL FIL.T.REAC.	mg/kg		0	8114.48	8787.88	2	2	100.0	48	47	97.9	8444.47	5911.32	1.06	4.59	100.0
NNO2FR	NITRITE,FIL.T. REACT.	mg/kg		0	6.90	6.90	1	1	100.0	1	1	100.0	6.90	6.90	0.00	0.00	100.0
NNOTHR	NITRATES,TOTAL FIL.T.REAC.	mg/kg		0	38.72	53.87	2	2	100.0	48	43	89.6	45.67	25.44	1.26	2.21	93.9
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/kg		0	46464.65	70707.07	2	2	100.0	51	51	100.0	57318.23	36897.85	1.35	2.98	100.0
PH	(-LOG(H+(CONCN))	mg/kg		0	6.16	6.41	2	2	100.0	49	49	100.0	6.28	6.03	1.05	1.10	100.0
PHNOL	PHENOLICS (4AAP)	mg/kg		0	104.38	148.15	2	2	100.0	50	41	82.0	124.35	82.34	1.28	3.54	85.3
PPUT	PHOSPHORUS,UNFIL.T.TOTAL	mg/kg		0	24915.82	41750.84	2	2	100.0	42	42	100.0	32253.01	20347.70	1.44	4.43	100.0
RST	RESIDUE, TOTAL	mg/kg		0	29700.00	29700.00	2	2	100.0	51	51	100.0	29700.00	32783.51	1.00	1.81	100.0
RSTLOI	RESIDUE,TOT.LOSS ON IGNI.	mg/kg		0	15400.00	15400.00	2	2	100.0	51	51	100.0	15400.00	20803.05	1.00	1.77	100.0
METALS																	
AGUT	SILVER,UNFIL.T.TOTAL	mg/kg		0	37.04	59.26	2	2	100.0	45	40	88.9	46.85	30.17	1.39	2.61	84.4
ALUT	ALUMINUM,UNFIL.T.TOTAL	mg/kg		0	7070.71	12794.61	2	2	100.0	51	51	100.0	9511.41	9835.74	1.52	2.51	100.0
ASUT	ARSENIC,UNFIL.T.TOTAL	mg/kg		0	18.86	23.57	2	2	100.0	51	50	98.0	21.08	6.13	1.17	2.01	97.1
CDUT	CADMIUM,UNFIL.T.TOTAL	mg/kg		0	13.13	27.61	2	2	100.0	43	40	93.0	19.04	9.74	1.69	4.35	90.0
COUT	COBALT,UNFIL.T.TOTAL	mg/kg		0	20.54	43.77	2	2	100.0	41	30	73.2	29.98	9.29	1.71	4.69	73.3
CRUT	CHROMIUM,UNFIL.T.TOTAL	mg/kg		0	808.08	1164.78	2	2	100.0	51	50	98.0	961.81	301.43	1.28	3.68	97.1
CUUT	COPPER,UNFIL.T.TOTAL	mg/kg		0	538.72	538.72	1	1	100.0	46	46	100.0	538.72	606.31	0.00	1.72	100.0
HGUT	MERCURY,UNFIL.T.TOTAL	mg/kg		0	2.36	2.36	2	2	100.0	50	50	100.0	2.36	2.23	1.00	1.67	100.0
MOUT	MOLYBDENUM,UNFIL.T.TOTAL	mg/kg		0	11.45	19.53	2	2	100.0	37	23	62.2	14.95	5.80	1.46	2.88	64.3
NIUT	NICKEL,UNFIL.T.TOTAL	mg/kg		0	114.48	141.41	2	2	100.0	46	44	95.7	127.24	59.17	1.16	2.90	93.3
PBUT	LEAD,UNFIL.T.TOTAL	mg/kg		0	225.59	471.38	2	2	100.0	49	48	98.0	326.10	173.99	1.68	2.24	96.9
SEUT	SELENIUM,UNFIL.T.TOTAL	mg/kg		0	4.38	22.90	2	2	100.0	50	48	96.0	10.01	3.04	3.22	1.93	93.9
SRUT	STRONTIUM,UNFIL.T.TOTAL	mg/kg		0	202.02	336.70	2	2	100.0	51	51	100.0	260.81	231.70	1.44	1.97	100.0
ZNUT	ZINC,UNFIL.T.TOTAL	mg/kg		0	1818.18	2592.59	2	2	100.0	51	51	100.0	2171.13	905.39	1.29	2.39	100.0
BEUT	BERYLLIUM,UNFIL.T.TOTAL	mg/kg		0	1.01	1.01	2	1	50.0	25	1	4.0	1.30	0.50	1.44	3.55	4.2
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																	
PMMCRE	M-CRESOL	ug/kg		1	367.00	414141.40	2	2	100.0	51	42	82.3	12328.40	116847.30	144.02	12.16	85.3
PMPHEN	PHENOL	ug/kg		2	15656.60	24633.00	2	2	100.0	51	15	29.4	19638.50	7312.80	1.38	3.00	38.2
PNBBFA	BENZO(B)FLUORANTHENE	ug/kg		1	7811.40	7811.40	2	1	50.0	51	1	2.0	5128.40	2924.20	1.81	1.82	2.9
PNFLAN	FLUORANTHENE	ug/kg		1	27878.80	27878.80	2	1	50.0	51	2	3.9	9688.50	3083.50	4.46	1.97	5.9
PNPHEN	PHENANTHRENE	ug/kg		1	24316.50	24316.50	2	1	50.0	51	6	11.8	9048.40	3563.50	4.05	2.19	17.7
PNPYR	PYRENE	ug/kg		1	20740.70	20740.70	2	1	50.0	51	2	3.9	10234.80	4522.60	2.72	1.87	5.9
PESTICIDES,HERBICIDES,PCBS																	
PTPCBT	PCB, TOTAL	ug/kg		2	195.30	2895.60	2	2	100.0	51	40	78.4	752.00	88.70	6.73	3.18	79.4
P245T	2,4,5-TRICLORPHENOXYACETC	ug/kg		3	50.50	370.40	2	2	100.0	51	21	41.2	136.80	48.90	4.09	3.49	47.1
P24D	2,4-DICHLOROPHENOXYACETIC	ug/kg		3	124.60	225.60	2	2	100.0	51	38	74.5	167.70	93.20	1.52	6.50	82.3
PSILV	SILVEX	ug/kg		3	37.00	67.30	2	2	100.0	51	23	45.1	49.90	47.30	1.53	3.40	55.9
PTBHCG	GAMMA-BHC(LINDANE)	ug/kg		2	101.00	101.00	2	1	50.0	51	28	54.9	18.50	8.90	11.00	2.69	67.7
PTDIEL	DIELDRIN	ug/kg		2	16.80	16.80	2	1	50.0	51	20	39.2	7.60	7.20	3.09	3.10	50.0
PTDMDT	METHOXYCHLOR	ug/kg		1	202.00	202.00	2	1	50.0	51	19	37.3	58.30	45.80	5.80	5.15	44.1
PTENDI	ENDOSULFAN I	ug/kg		3	13.50	13.50	2	1	50.0	51	9	17.7	6.80	4.60	2.65	2.56	20.6
PTHEPE	HEPTACHLOREPOXIDE	ug/kg		2	16.80	16.80	2	1	50.0	51	12	23.5	7.60	5.00	3.09	2.62	32.4

PLANT NAME : Hamilton (Woodward)
PLANT TYPE : Secondary

SAMPLING TYPE : Raw Sludge
SAMPLE FORM : Dry Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS (DRY WEIGHT)	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
P1HEPT	HEPTACHLOR	ug/kg	3	101.00	101.00	2	1	50.0	51	7	13.7	18.50	4.50	11.00	2.83	20.6
P1MIRX	MIREX	ug/kg	1	101.00	101.00	2	1	50.0	51	2	3.9	18.50	4.00	11.00	2.37	5.9
P1PPDD	PP-DDD	ug/kg	1	101.00	101.00	2	1	50.0	51	13	25.5	18.50	5.10	11.00	2.48	35.3
X2124	1,2,4-TRICHLOROBENZENE	ug/kg	3	269.40	269.40	2	1	50.0	51	17	33.3	30.30	9.30	22.02	4.06	41.2
	VOLATILE ORGANIC COMPOUNDS															
X1CHLO	CHLOROFORM (CHCL3)	ug/kg	1	5387.20	5387.20	2	1	50.0	51	12	23.5	1904.70	1225.10	4.35	4.24	35.3
X1TETR	TETRACHLOROETHYLENE	ug/kg	1	1346.80	1346.80	2	1	50.0	51	3	5.9	952.30	661.30	1.63	1.90	8.8

PLANT NAME : Hamilton (Woodward)
PLANT TYPE : Secondary

SAMPLING TYPE : Treated Sludge
SAMPLE FORM : Dry Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS (DRY WEIGHT)	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/kg	0	23699.99	23699.99	1	1	100.0	49	49	100.0	23699.99	38494.12	0.00	1.77	100.0
PH	(-LOG(H+(CONCN))	mg/kg	0	7.20	7.20	1	1	100.0	47	47	100.0	7.20	7.17	0.00	1.09	100.0
PHENOL	PHENOLICS (4AAP)	mg/kg	0	9.23	38.59	2	2	100.0	49	41	83.7	18.88	43.05	2.75	3.14	87.9
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/kg	0	27120.00	27120.00	1	1	100.0	43	43	100.0	27120.00	76638.67	0.00	6.91	100.0
RST	RESIDUE, TOTAL	mg/kg	0	303200.00	303200.00	2	2	100.0	50	50	100.0	303200.00	80434.06	1.00	3.23	100.0
RSTLOI	RESIDUE,TOT.LOSS ON IGNI.	mg/kg	0	136318.72	136318.72	2	2	100.0	50	50	100.0	136318.72	43379.33	1.00	3.19	100.0
METALS																
AGUT	SILVER,UNFILT.TOTAL	mg/kg	0	32.98	49.47	2	2	100.0	44	44	100.0	40.39	37.78	1.33	2.33	100.0
ALUT	ALUMINUM,UNFILT.TOTAL	mg/kg	0	8773.09	11213.72	2	2	100.0	50	50	100.0	9918.62	10715.94	1.19	2.82	100.0
ASUT	ARSENIC,UNFILT.TOTAL	mg/kg	0	14.02	14.61	2	2	100.0	50	49	98.0	14.31	5.40	1.03	2.06	97.1
CDUT	CADMIUM,UNFILT.TOTAL	mg/kg	0	15.50	16.49	2	2	100.0	45	41	91.1	15.99	10.47	1.04	3.98	90.3
COUT	COBALT,UNFILT.TOTAL	mg/kg	0	3.63	31.99	2	2	100.0	39	32	82.1	10.77	9.14	4.66	2.75	85.7
CRUT	CHROMIUM,UNFILT.TOTAL	mg/kg	0	560.69	1121.37	2	2	100.0	50	50	100.0	792.93	333.06	1.63	3.59	100.0
CUUT	COPPER,UNFILT.TOTAL	mg/kg	0	791.56	791.56	1	1	100.0	45	45	100.0	791.56	732.24	0.00	2.16	100.0
HGUT	MERCURY,UNFILT.TOTAL	mg/kg	0	2.11	5.28	2	2	100.0	50	49	98.0	3.34	3.24	1.91	2.04	97.1
NIUT	NICKEL,UNFILT.TOTAL	mg/kg	0	56.07	145.12	2	2	100.0	45	42	93.3	90.20	72.95	1.96	2.95	90.0
PBUT	LEAD,UNFILT.TOTAL	mg/kg	0	244.06	362.80	2	2	100.0	50	49	98.0	297.57	196.62	1.32	2.46	97.1
SEUT	SELENIUM,UNFILT.TOTAL	mg/kg	0	8.61	14.18	2	2	100.0	50	48	96.0	11.05	2.67	1.42	2.98	97.1
SRUT	STRONTIUM,UNFILT.TOTAL	mg/kg	0	224.27	247.36	2	2	100.0	50	50	100.0	235.54	240.93	1.07	2.54	100.0
ZNUT	ZINC,UNFILT.TOTAL	mg/kg	0	1517.15	2935.36	2	2	100.0	50	50	100.0	2110.30	988.90	1.59	2.57	100.0
BEUT	BERYLLIUM,UNFILT.TOTAL	mg/kg	0	0.63	0.63	2	1	50.0	26	1	3.9	1.02	0.47	1.98	3.32	4.2
MOUT	MOLYBDENUM,UNFILT.TOTAL	mg/kg	0	10.22	10.22	2	1	50.0	34	23	67.7	6.49	6.41	1.90	2.84	69.2
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PNFLAN	FLUORANTHENE	ug/kg	1	8.20	22097.60	2	2	100.0	50	4	8.0	425.70	1338.90	266.53	4.26	8.8
PNANTH	ANTHRACENE	ug/kg	1	3957.80	3957.80	2	1	50.0	50	1	2.0	1142.50	1306.60	5.80	3.21	2.9
PNBAA	BENZO(A)ANTHRACENE	ug/kg	1	14511.90	14511.90	2	1	50.0	50	2	4.0	2187.70	1379.50	14.52	3.41	5.9
PNBAP	BENZO(A)PYRENE	ug/kg	1	10883.90	10883.90	2	1	50.0	50	1	2.0	1894.60	1333.30	11.85	3.30	2.9
PNBKF	BENZO(K)FLUORANTHENE	ug/kg	1	20448.50	20448.50	2	1	50.0	50	1	2.0	2596.90	1350.20	18.51	3.39	2.9
PNCHRY	CHRYSENE	ug/kg	1	13852.20	13852.20	2	1	50.0	50	4	8.0	2137.40	1475.50	14.05	3.39	11.8
PNFLUO	FLUORENE	ug/kg	1	4947.20	4947.20	2	1	50.0	50	3	6.0	1277.30	1352.10	6.79	3.25	8.8
PNNAPH	NAPHTHALENE	ug/kg	1	4287.60	4287.60	2	1	50.0	50	6	12.0	1189.10	1545.60	6.13	3.77	14.7
PNPHEN	PHENANTHRENE	ug/kg	1	15171.50	15171.50	2	1	50.0	50	12	24.0	2236.90	2220.50	14.99	4.27	26.5
PNPYR	PYRENE	ug/kg	1	18799.50	18799.50	2	1	50.0	50	3	6.0	3049.60	2124.30	13.09	3.44	8.8
DIOXINS AND FURANS																
P96CDD	OCTACHLORODIBENZODIOXIN	ug/kg	1	6.30	6.30	1	1	100.0	49	26	53.1	6.30	7.10	0.00	3.84	64.7
PESTICIDES,HERBICIDES,PCBS																
P1MIRX	MIREX	ug/kg	1	7.90	80.80	2	2	100.0	50	8	16.0	25.30	4.90	5.18	2.52	17.7
P1PCBT	PCB, TOTAL	ug/kg	2	162.10	5592.10	2	2	100.0	50	32	64.0	952.10	114.10	12.23	4.58	67.7
P1PPDE	PP-DDE	ug/kg	1	6.70	33.00	2	2	100.0	50	34	68.0	14.90	11.10	3.09	2.72	73.5
X2124	1,2,4-TRICHLOROBENZENE	ug/kg	3	82.50	549.40	2	2	100.0	50	22	44.0	212.90	14.80	3.82	5.02	52.9

PLANT NAME : Hamilton (Woodward)
PLANT TYPE : Secondary

SAMPLING TYPE : Treated Sludge
SAMPLE FORM : Dry Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS (DRY WEIGHT)	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
P1ALDR	ALDRIN	ug/kg	1	13.50	13.50	2	1	50.0	50	11	22.0	6.70	5.30	2.71	2.67	26.5
P1BHCB	BETA-BHC (HEXCHLORCYCLOHEXANE)	ug/kg	1	131.40	131.40	2	1	50.0	50	19	38.0	20.80	8.80	13.53	4.39	47.1
P1CHLA	ALPHA-CHLORDANE	ug/kg	1	14.70	14.70	2	1	50.0	50	22	44.0	7.00	6.50	2.88	2.41	55.9
P1CHLG	GAMMA-CHLORDANE	ug/kg	1	20.10	20.10	2	1	50.0	50	21	42.0	8.10	6.80	3.59	2.58	52.9
P1DIEL	DIELDRIN	ug/kg	2	13.10	13.10	2	1	50.0	50	15	30.0	6.60	6.50	2.65	3.51	38.2
P1OCHL	OXYCHLORDANE	ug/kg	2	17.70	17.70	2	1	50.0	50	6	12.0	7.60	4.20	3.28	2.24	17.7
P1PMIR	MIREX PHOTO	ug/kg	2	16.00	16.00	2	1	50.0	50	2	4.0	7.30	3.90	3.05	2.25	5.9
P324D	2,4-DICHLOROPHENOXYACETIC ACID	ug/kg	3	1047.30	1047.30	2	1	50.0	50	25	50.0	131.50	75.00	18.82	5.81	64.7
P3SILV	SILVEX	ug/kg	3	194.00	194.00	2	1	50.0	50	18	36.0	113.20	92.70	2.14	2.94	44.1
X1HCCP	HEXACHLOROCYCLOPENTADIENE	ug/kg	3	160.50	160.50	2	1	50.0	50	8	16.0	51.50	34.20	5.00	2.76	23.5
X2HCB	HEXACHLOROBENZENE	ug/kg	2	15.20	15.20	2	1	50.0	50	21	42.0	7.10	7.00	2.94	2.96	55.9
VOLATILE ORGANIC COMPOUNDS																
B2ETBNZ	ETHYLBENZENE (C8H10)	ug/kg	1	181.40	181.40	2	1	50.0	50	14	28.0	109.40	608.50	2.04	5.59	32.4
B2MPXY	M-, AND P-XYLENES	ug/kg	1	626.60	626.60	2	1	50.0	50	15	30.0	203.40	816.00	4.91	7.11	32.4
B2OXYL	O-XYLENE (C8H10)	ug/kg	1	824.50	824.50	2	1	50.0	50	14	28.0	233.30	523.50	5.96	4.05	32.4
X1CHLO	CHLOROFORM (CHCL3)	ug/kg	1	8575.20	8575.20	2	1	50.0	50	12	24.0	752.30	441.70	31.23	4.33	35.3

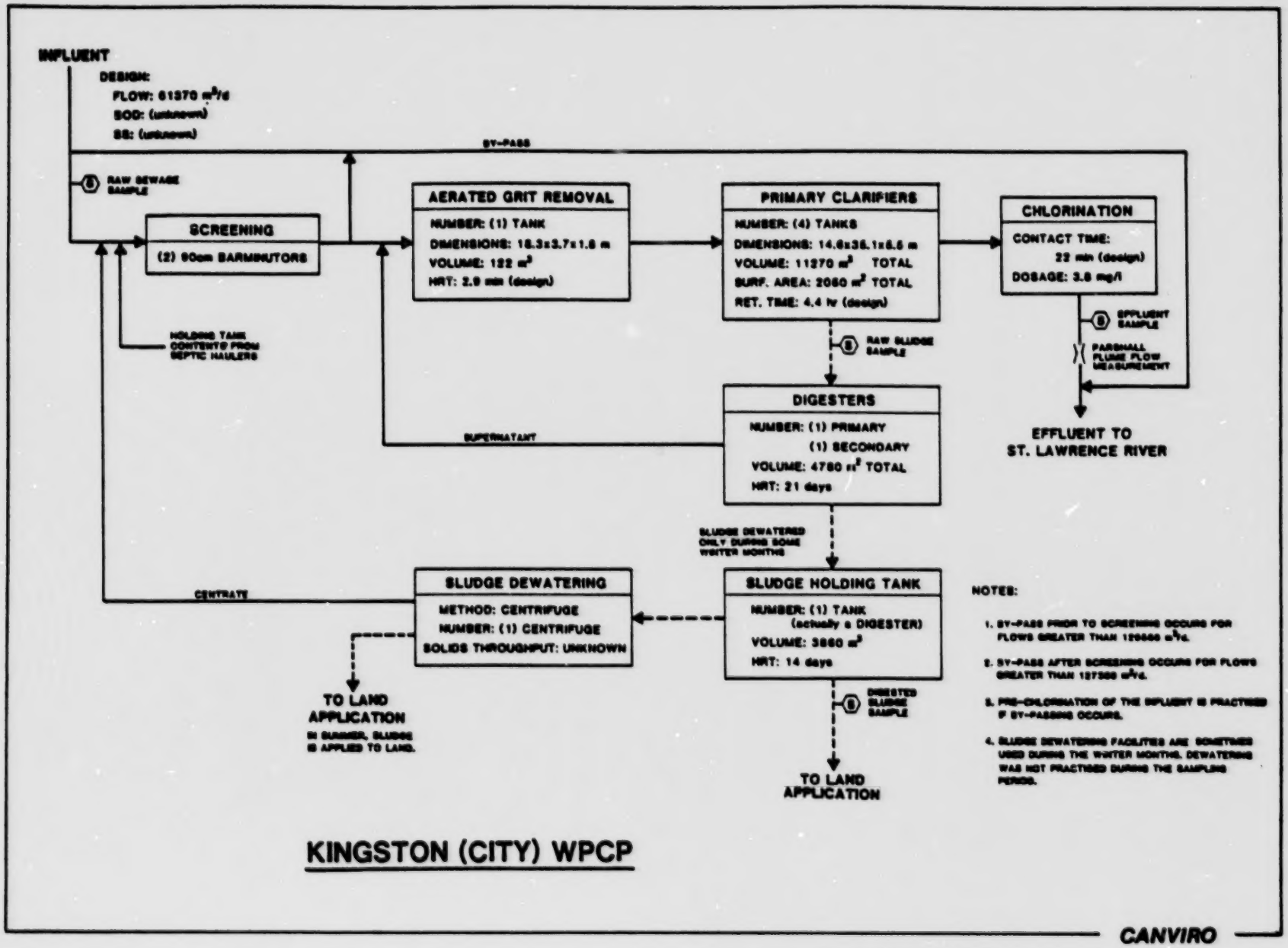
Sub-Appendix A-8

Kingston City WPCP

Contents:

- Plant Schematic with Design Characteristics
- Annual Data Review (1981 - 1986 Plant Performance)
- Sources of Municipal Water Pollution Control Plant Raw Sewage
- Operational Evaluation for Kingston City WPCP
- Analytical Data

(KIR18/28A)


INFLUENT
DESIGN:
FLOW: 61370 m³/d
BOD: (unknown)
SS: (unknown)
BY-PASS
RAW SEWAGE SAMPLE
SCREENING
(2) 90cm BARMINUTORS
HOLDING TANK CONTENTS FROM SEPTIC HAULERS
AERATED GRIT REMOVAL
NUMBER: (1) TANK
DIMENSIONS: 18.3x3.7x1.8 m
VOLUME: 122 m³
HRT: 2.9 min (design)
PRIMARY CLARIFIERS
NUMBER: (4) TANKS
DIMENSIONS: 14.6x36.1x6.6 m
VOLUME: 11270 m³ TOTAL
SURF. AREA: 2060 m² TOTAL
RET. TIME: 4.4 hr (design)
RAW SLUDGE SAMPLE
CHLORINATION
CONTACT TIME: 22 min (design)
DOSAGE: 3.8 mg/l
EFFLUENT SAMPLE
PARSHALL FLUME FLOW MEASUREMENT
EFFLUENT TO ST. LAWRENCE RIVER
DIGESTERS
NUMBER: (1) PRIMARY
(1) SECONDARY
VOLUME: 4780 m³ TOTAL
HRT: 21 days
SUPERNATANT
SLUDGE DEWATERED ONLY DURING SOME WINTER MONTHS
SLUDGE HOLDING TANK
NUMBER: (1) TANK (actually a DIGESTER)
VOLUME: 3860 m³
HRT: 14 days
DIGESTED SLUDGE SAMPLE
SLUDGE DEWATERING
METHOD: CENTRIFUGE
NUMBER: (1) CENTRIFUGE
SOLIDS THROUGHPUT: UNKNOWN
CENTRATE
TO LAND APPLICATION
IN SUMMER, SLUDGE IS APPLIED TO LAND.
TO LAND APPLICATION
NOTES:
1. BY-PASS PRIOR TO SCREENING OCCURS FOR FLOWS GREATER THAN 129600 m³/d.
2. BY-PASS AFTER SCREENING OCCURS FOR FLOWS GREATER THAN 127300 m³/d.
3. PRE-CHLORINATION OF THE EFFLUENT IS PRACTISED IF BY-PASSING OCCURS.
4. SLUDGE DEWATERING FACILITIES ARE SOMETIMES USED DURING THE WINTER MONTHS. DEWATERING WAS NOT PRACTISED DURING THE SAMPLING PERIOD.
KINGSTON (CITY) WPCP
CANVIRO

KINGSTON WPCP
Primary
Phosphorus Removal - Continuous
Capacity - 61.371 10(3)m3/day

PARAMETER	1981	1982	1983	1984	1985	5 YEAR AVERAGE 81-85
Avg. Daily Flow (1000 m3/day)	53.64	60.81	60.86	57.33	66.37	58.72
BOD5 - Influent (mg/L)	102.00	105.00	107.50	94.83	96.50	101.69
BOD5 - Effluent (mg/L)	22.00	23.00	29.75	25.00	23.67	24.00
Annual BOD5 Significantly Different from Mean Annual Average BOD5?	I.D.	I.D.	I.D.	I.D.	I.D.	
TSS - Influent (mg/L)	117.00	133.00	132.00	121.33	113.33	124.46
TSS - Effluent (mg/L)	35.00	31.00	25.92	37.00	19.83	30.87
Annual TSS Significantly Different from Mean Annual Average TSS?	I.D.	I.D.	I.D.	I.D.	I.D.	
Total P - Influent (mg/L)	3.40	3.90	4.11	3.40	4.22	3.78
Total P - Effluent (mg/L)	1.20	1.10	0.91	0.96	0.78	1.01
Annual TP Significantly Different from Mean Annual Average TP?	I.D.	I.D.	I.D.	I.D.	I.D.	
TP in Compliance?	N	N	Y	Y	Y	N

I.D. - Insufficient Data

R

SOURCES OF MUNICIPAL WATER POLLUTION CONTROL PLANT RAW SEWAGE

GENERAL DESCRIPTION OF WATER POLLUTION CONTROL PLANT (WPCP)

NAME OF WPCP	KINGSTON CITY WPCP
WORKS NUMBER	120001050
TREATMENT TYPE	PRIMARY PHOSPHORUS REMOVAL CONTINUOUS
DESIGN CAPACITY (1000 m3/d)	61.371
1986 AVERAGE DAY FLOW (1000 m3/d)	76.484
POPULATION SERVED	67000

% OF TOTAL FLOW ATTRIBUTED TO:

INDUSTRIAL SOURCES (%)	2
COMMERCIAL SOURCES (%) (Population x 0.0757)	7
RESIDENTIAL SOURCES (%) (Population x 0.175)	15
UNACCOUNTED FOR, INCL. INFILTRATION (100-% Contributed from industrial, commercial and residential sources)	76

PROFILE OF INDUSTRIES IN CATCHMENT

TOTAL NO OF INDUSTRIES	99
INDUSTRIES WITH WATER	40
NO OF SIC CATEGORIES	23

DESCRIPTION OF THE TOP 5 INDUSTRIES DISCHARGED TO THE WPCP
(BASED ON WATER USE DATA)

DESCRIPTION	SIC	# OF COMPANIES
DAIRY	2021-2026	1
TEXTILE	2271-2299	2
STONE, CLAY & MINERAL PRODUCTS	3200-3299	2
WASTE TREATMENT & DISPOSAL	4592-4952	4
PRINTING AND PUBLISHING	2700-2799	9

OPERATIONAL EVALUATION FOR: K I N G S T O N C I T Y W P C P

TREATMENT FACILITY: Primary
PERIOD ENDING: May 22, 1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 61,370 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
RAW SEWAGE FLOW							
% of Design Flow							
Influent BOD (mg/L)							
Primary BOD (mg/L)							
Secondary BOD (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent SS (mg/L)							
Primary SS (mg/L)							
Secondary SS (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)							
Primary Total P (mg/L)							
Secondary Total P (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							

OPERATIONAL EVALUATION FOR: KINGSTON CITY WPCP

TREATMENT FACILITY: Primary
PERIOD ENDING: May 22, 1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 61,370 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 8	DAY 9	DAY 10	DAY 11	DAY 12	DAY 13	DAY 14
RAW SEWAGE FLOW			50,007				
% of Design Flow			81.48%				
Influent BOD (mg/L)			74.0				
Primary BOD (mg/L)							
Secondary BOD (mg/L)			17.0				
% PRIMARY REMOVAL							
% SECONDARY REMOVAL			77.0%				
Influent SS (mg/L)			41.0				
Primary SS (mg/L)							
Secondary SS (mg/L)			15.0				
% PRIMARY REMOVAL							
% SECONDARY REMOVAL			63.4%				
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)			16.5				
Primary TKN (mg/L)							
Secondary TKN (mg/L)			15.4				
% PRIMARY REMOVAL							
% SECONDARY REMOVAL			6.7%				
Influent Total P (mg/L)			3.00				
Primary Total P (mg/L)							
Secondary Total P (mg/L)			0.50				
% PRIMARY REMOVAL							
% SECONDARY REMOVAL			83.3%				

OPERATIONAL EVALUATION FOR: KINGSTON CITY WPCP

TREATMENT FACILITY: Primary
PERIOD ENDING: May 22, 1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 61,370 m3/d

PARAMETER	SAMPLING PERIOD DAY 15	DAY 16	DAY 17	DAY 18	DAY 19	DAY 20	DAY 21
RAW SEWAGE FLOW			52,735				
% of Design Flow			85.93%				
Influent BOD (mg/L)		98.0					
Primary BOD (mg/L)							
Secondary BOD (mg/L)		34.0					
% PRIMARY REMOVAL							
% SECONDARY REMOVAL		65.3					
Influent SS (mg/L)	84.0	64.0	96.0				
Primary SS (mg/L)							
Secondary SS (mg/L)	10.5	20.0	11.0				
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	87.5	68.7	88.5				
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)		4.10					
Primary Total P (mg/L)							
Secondary Total P (mg/L)		0.60					
% PRIMARY REMOVAL							
% SECONDARY REMOVAL		85.4					

PLANT NAME : Kingston (City)
PLANT TYPE : Primary

SAMPLING TYPE : Raw Sewage
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0	45.80	79.40	5	5	100.0	267	266	99.6	62.17	140.23	1.23	1.93	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0	138.00	210.00	5	5	100.0	260	258	99.2	160.51	287.75	1.17	1.82	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0	12.00	15.50	5	5	100.0	271	271	100.0	12.94	22.39	1.11	1.81	100.0
NNHTPR	AMMONIUM,TOTAL PILT.FRAC.	mg/L	0	11.70	15.90	5	5	100.0	275	274	99.6	13.43	15.37	1.12	1.69	100.0
NNTKUR	NITROGEN-TOT-KJEL,UNP.TOT	mg/L	0	16.50	19.30	5	5	100.0	273	273	100.0	18.27	25.44	1.06	1.47	100.0
PH	(-LOG(H+(CONCN))		0	6.69	7.02	5	5	100.0	275	275	100.0	6.87	6.90	1.02	1.05	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0	79.60	107.00	5	5	100.0	267	266	99.6	93.89	126.88	1.12	1.93	100.0
METALS																
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	0.14	0.37	5	5	100.0	283	274	96.8	0.26	0.23	1.46	2.11	100.0
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	580.00	620.00	6	6	100.0	319	318	99.7	600.00	370.70	1.03	2.14	100.0
COUT	COBALT,UNFILT.TOTAL	ug/L	0	10.00	20.00	6	5	83.3	322	82	25.5	10.00	9.30	1.69	2.31	83.8
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	20.00	40.00	6	4	66.7	322	315	97.8	20.00	211.00	1.81	2.94	100.0
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	30.00	30.00	6	1	16.7	322	237	73.6	10.00	51.10	1.57	3.44	89.2
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PMMCRE	M-CRESOL	ug/L	1	16.10	65.50	5	3	60.0	275	167	60.7	16.53	25.59	2.45	3.45	86.5
PMPHEN	PHENOL	ug/L	2	16.70	16.70	5	1	20.0	275	118	42.9	8.80	14.52	1.43	2.46	78.4
PESTICIDES,HERBICIDES,PCBS																
P324D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	0.09	0.69	5	5	100.0	276	214	77.5	0.16	0.13	2.28	3.72	100.0
P1BHCG	GAMMA-BHC(HEXACHLORCYCLOHEXANE)	ug/L	2	0.03	0.03	5	1	20.0	276	143	51.8	0.01	0.02	1.63	2.29	94.6

PLANT NAME : Kingston (City) — **SAMPLING TYPE : Final Effluent**
PLANT TYPE : Primary — **SAMPLE FORM : Wet Weight**

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	STD. FOR SURFACE WATER	STD. REF.	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET.	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																		
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0		-	20.80	82.40	5	5	100.0	40	40	100.0	49.58	48.40	1.67	2.05	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0		-	50.00	122.00	5	5	100.0	40	40	100.0	85.88	108.56	1.40	1.56	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0		-	8.00	10.20	5	5	100.0	40	40	100.0	9.03	12.80	1.09	1.40	100.0
NNHTPR	AMMONIUM,TOTAL FILT.REAC.	mg/L	0		-	12.80	13.50	5	5	100.0	40	40	100.0	13.10	10.46	1.02	1.66	100.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0		-	15.20	16.50	5	5	100.0	40	40	100.0	15.85	15.36	1.04	1.30	100.0
PH	(-LOG(H+(CONCN))		0		-	7.01	7.24	5	5	100.0	40	40	100.0	7.11	6.88	1.01	1.03	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0		-	7.50	28.80	5	5	100.0	39	39	100.0	18.03	29.57	1.71	1.73	100.0
METALS																		
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	75.00	ONT-MOE	130.00	1000.00	6	6	100.0	48	46	95.8	270.00	550.00	2.01	3.45	100.0
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	100.00	ONT-MOE	10.00	40.00	6	6	100.0	48	29	60.4	20.00	10.80	1.69	1.94	85.7
CUUT	COPPER,UNFILT.TOTAL	ug/L	0	5.00	ONT-MOE	60.00	60.00	1	1	100.0	8	7	87.5	60.00	18.20	0.00	1.85	100.0
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	0.20	ONT-MOE	0.03	0.13	5	5	100.0	39	38	97.4	0.06	0.05	1.76	2.42	100.0
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	3750.00	ONT-MOE	520.00	610.00	6	6	100.0	48	47	97.9	560.00	304.90	1.06	2.83	100.0
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	30.00	ONT-MOE	50.00	80.00	6	6	100.0	48	48	100.0	50.00	69.80	1.38	3.04	100.0
MOUT	MOLYBDENUM,UNFILT.TOTAL	ug/L	0		-	10.00	20.00	6	4	66.7	48	11	22.9	10.00	6.60	1.69	1.86	71.4
COUT	COBALT,UNFILT.TOTAL	ug/L	0	5.00	NYS-STD	10.00	20.00	6	3	50.0	48	11	22.9	10.00	6.50	1.76	1.58	85.7
CDUT	CADMIUM,UNFILT.TOTAL	ug/L	0	0.20	ONT-MOE	0.00	10.00	6	2	33.3	48	18	37.5	0.00	2.50	1.67	1.96	85.7
CCNFUR	CYANIDE-FREE,UNFILT.REAC.	ug/L	0	5.00	ONT-MOE	40.00	40.00	5	1	20.0	40	3	7.5	0.00	0.90	7.02	2.61	42.9
PESTICIDES,HERBICIDES,PCBS																		
P24D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	4.00	ONT-MOE	0.15	1.70	5	5	100.0	40	27	67.5	0.55	0.06	3.15	4.96	85.7
P1BHCG	GAMMA-BHC(HEXCHLORCYCLOHEXANE)	ug/L	2	0.06	ONT-MOE	0.01	0.03	5	4	80.0	40	29	72.5	0.01	0.02	2.03	2.28	85.7
P5SILV	SILVEX	ug/L	3		-	0.06	1.40	5	3	60.0	40	9	22.5	0.10	0.03	5.55	2.19	57.1
P245T	2,4,5-TRICLORPHENOXYACETIC ACID	ug/L	3		-	0.55	2.80	5	2	40.0	40	7	17.5	0.12	0.04	9.16	2.61	42.9
VOLATILES ORGANIC COMPOUNDS																		
X1TETR	TETRACHLOROETHYLENE	ug/L	1	0.70	NYS-GUL	2.20	2.20	5	1	20.0	38	21	55.3	1.17	4.39	1.42	5.84	85.7

PLANT NAME : Kingston (City)
PLANT TYPE : Primary

SAMPLING TYPE : Raw Sludge
SAMPLE FORM : Dry Weight

CONTAM-INANT	CONTAMINANT NAME	UNITSQA/QC (DRY WEIGHT)	CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
COD	CHEMICAL OXYGEN DEMAND	mg/kg	0	4161.85	4161.85	1	1	100.0	45	45	100.0	4161.85	892221.45	0.00	3.19	100.0
NNHTPR	AMMONIUM,TOTAL FIL.T.REAC.	mg/kg	0	5751.45	5751.45	1	1	100.0	48	47	97.9	5751.45	5911.32	0.00	4.59	100.0
NNTKUR	NITROGEN-TOT-KJEL.,UNF.TOT	mg/kg	0	27456.65	27456.65	1	1	100.0	51	51	100.0	27456.65	36897.85	0.00	2.98	100.0
PH	(-LOG(H+(CONCN))	mg/kg	0	6.67	6.67	1	1	100.0	49	49	100.0	6.67	6.03	0.00	1.10	100.0
PHENOL	PHENOLICS (4AAP)	mg/kg	0	92.49	92.49	1	1	100.0	50	41	82.0	92.49	82.34	0.00	3.54	85.3
RST	RESIDUE, TOTAL	mg/kg	0	34600.00	34600.00	1	1	100.0	51	51	100.0	34600.00	32783.51	0.00	1.81	100.0
RSTLOI	RESIDUE,TOT.LOSS ON IGNI.	mg/kg	0	20400.00	20400.00	1	1	100.0	51	51	100.0	20400.00	20803.05	0.00	1.77	100.0
METALS																
AGUT	SILVER,UNFIL.T.TOTAL	mg/kg	0	86.71	86.71	1	1	100.0	45	40	88.9	86.71	30.17	0.00	2.61	84.4
ALUT	ALUMINUM,UNFIL.T.TOTAL	mg/kg	0	20809.25	20809.25	1	1	100.0	51	51	100.0	20809.25	9835.74	0.00	2.51	100.0
ASUT	ARSENIC,UNFIL.T.TOTAL	mg/kg	0	4.62	4.62	1	1	100.0	51	50	98.0	4.62	6.13	0.00	2.01	97.1
CDUT	CADMIUM,UNFIL.T.TOTAL	mg/kg	0	16.19	16.19	1	1	100.0	43	40	93.0	16.19	9.74	0.00	4.35	90.0
CRUT	CHROMIUM,UNFIL.T.TOTAL	mg/kg	0	1156.07	1156.07	1	1	100.0	51	50	98.0	1156.07	301.43	0.00	3.68	97.1
CUUT	COPPER,UNFIL.T.TOTAL	mg/kg	0	491.33	491.33	1	1	100.0	46	46	100.0	491.33	606.31	0.00	1.72	100.0
HGUT	MERCURY,UNFIL.T.TOTAL	mg/kg	0	5.49	5.49	1	1	100.0	50	50	100.0	5.49	2.23	0.00	1.67	100.0
SEUT	SELENIUM,UNFIL.T.TOTAL	mg/kg	0	2.89	2.89	1	1	100.0	50	48	96.0	2.89	3.04	0.00	1.93	93.9
SRUT	STRONTIUM,UNFIL.T.TOTAL	mg/kg	0	578.03	578.03	1	1	100.0	51	51	100.0	578.03	231.70	0.00	1.97	100.0
ZNUT	ZINC,UNFIL.T.TOTAL	mg/kg	0	491.33	491.33	1	1	100.0	51	51	100.0	491.33	905.39	0.00	2.39	100.0
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PMMCRE	M-CRESOL	ug/kg	1	1017341.00	1017341.00	1	1	100.0	51	42	82.3	1017341.00	116847.30	0.00	12.16	85.3
PMPHEN	PHENOL	ug/kg	2	25260.10	25260.10	1	1	100.0	51	15	29.4	25260.10	7312.80	0.00	3.00	38.2
DIOXINS AND FURANS																
P97CDD	HEPTACHLORODIBENZODIOXIN	ug/kg	1	1.40	1.40	1	1	100.0	50	6	12.0	1.40	7.20	0.00	4.12	17.7
P98CDD	OCTACHLORODIBENZODIOXIN	ug/kg	1	6.90	6.90	1	1	100.0	50	25	50.0	6.90	8.50	0.00	3.60	58.8
P98CDF	OCTACHLORODIBENZOFURAN	ug/kg	1	1.80	1.80	1	1	100.0	50	4	8.0	1.80	5.40	0.00	3.48	11.8
PESTICIDES,HERBICIDES,PCBS																
P345T	2,4,5-TRICLORPHENOXYACETIC ACID	ug/kg	3	43.40	43.40	1	1	100.0	51	21	41.2	43.40	48.90	0.00	3.49	47.1
P24D	2,4-DICHLOROPHENOXYACETIC ACID	ug/kg	3	54.90	54.90	1	1	100.0	51	38	74.5	54.90	93.20	0.00	6.50	82.3
VOLATILE ORGANIC COMPOUNDS																
X1CDBM	CHLORODIBROMOMETHANE	ug/kg	1	7312.10	7312.10	1	1	100.0	51	1	2.0	7312.10	641.20	0.00	1.99	2.9

PLANT NAME : Kingston (City)
PLANT TYPE : Primary

SAMPLING TYPE : Treated Sludge
SAMPLE FORM : Dry Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS (DRY WEIGHT)	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
COD	CHEMICAL OXYGEN DEMAND	mg/kg	0	2760.08	2760.08	1	1	100.0	36	36	100.0	2760.08	508097.94	0.00	4.65	100.0
NNHTPR	AMMONIUM,TOTAL.FIL.T.REAC.	mg/kg	0	7898.09	7898.09	1	1	100.0	25	25	100.0	7898.09	176528	0.00	2.92	100.0
NNOTPR	NITRATES,TOTAL.FIL.T.REAC.	mg/kg	0	20.17	20.17	1	1	100.0	26	23	88.5	20.17	42.68	0.00	2.29	95.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/kg	0	33970.28	33970.28	1	1	100.0	49	49	100.0	33970.28	38494.12	0.00	1.77	100.0
PH	(-LOG(H+(CONCN))	mg/kg	0	6.97	6.97	1	1	100.0	47	47	100.0	6.97	7.17	0.00	1.09	100.0
PHNOL	PHENOLICS (4AAP)	mg/kg	0	110.40	110.40	1	1	100.0	49	41	83.7	110.40	43.05	0.00	3.14	87.9
RST	RESIDUE, TOTAL	mg/kg	0	47100.00	47100.00	1	1	100.0	50	50	100.0	47100.00	80434.04	0.00	3.23	100.0
RSTLOI	RESIDUE,TOT.LOSS ON IGNI.	mg/kg	0	22400.00	22400.00	1	1	100.0	50	50	100.0	22400.00	43379.33	0.00	3.19	100.0
METALS																
AGUT	SILVER,UNFIL.T.TOTAL.	mg/kg	0	74.31	74.31	1	1	100.0	44	44	100.0	74.31	37.78	0.00	2.33	100.0
ALUT	ALUMINUM,UNFIL.T.TOTAL.	mg/kg	0	17409.77	17409.77	1	1	100.0	50	50	100.0	17409.77	10715.94	0.00	2.82	100.0
ASUT	ARSENIC,UNFIL.T.TOTAL.	mg/kg	0	5.94	5.94	1	1	100.0	50	49	98.0	5.94	5.40	0.00	2.06	97.1
CRUT	CHROMIUM,UNFIL.T.TOTAL.	mg/kg	0	955.41	955.41	1	1	100.0	50	50	100.0	955.41	333.06	0.00	3.59	100.0
CUUT	COPPER,UNFIL.T.TOTAL.	mg/kg	0	615.71	615.71	1	1	100.0	45	45	100.0	615.71	732.24	0.00	2.16	100.0
HGUT	MERCURY,UNFIL.T.TOTAL.	mg/kg	0	1.70	1.70	1	1	100.0	50	49	98.0	1.70	3.24	0.00	2.04	97.1
PBUT	LEAD,UNFIL.T.TOTAL.	mg/kg	0	276.01	276.01	1	1	100.0	50	49	98.0	276.01	196.62	0.00	2.46	97.1
SEUT	SELENIUM,UNFIL.T.TOTAL.	mg/kg	0	5.31	5.31	1	1	100.0	50	48	96.0	5.31	2.67	0.00	2.98	97.1
SRUT	STRONTIUM,UNFIL.T.TOTAL.	mg/kg	0	594.48	594.48	1	1	100.0	50	50	100.0	594.48	240.93	0.00	2.54	100.0
ZNUT	ZINC,UNFIL.T.TOTAL.	mg/kg	0	530.79	530.79	1	1	100.0	50	50	100.0	530.79	988.90	0.00	2.57	100.0
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PNPHEN	PHENANTHRENE	ug/kg	1	14849.30	14849.30	1	1	100.0	50	12	24.0	14849.30	2220.50	0.00	4.27	26.5
DIOXINS AND FURANS																
P97CDD	HEPTACHLORODIBENZODIOXIN	ug/kg	1	1.40	1.40	1	1	100.0	49	10	20.4	1.40	5.00	0.00	3.21	23.5
P98CDD	OCTACHLORODIBENZODIOXIN	ug/kg	1	5.90	5.90	1	1	100.0	49	26	53.1	5.90	7.10	0.00	3.84	64.7
PESTICIDES,HERBICIDES,PCBS																
P1BHCA	ALPHA-BHC(HEXACHLORCYCLOHEXANE)	ug/kg	1	4.20	4.20	1	1	100.0	50	11	22.0	4.20	5.60	0.00	3.00	32.4
P1BHCB	BETA-BHC (HEXACHLORCYCLOHEXANE)	ug/kg	1	14.90	14.90	1	1	100.0	50	19	38.0	14.90	8.80	0.00	4.39	47.1
P1CHLA	ALPHA-CHLORDANE	ug/kg	1	4.20	4.20	1	1	100.0	50	22	44.0	4.20	6.50	0.00	2.41	55.9
P1CHLG	GAMMA-CHLORDANE	ug/kg	1	6.40	6.40	1	1	100.0	50	21	42.0	6.40	6.80	0.00	2.58	52.9
P1DMDT	METHOXYCHLOR	ug/kg	1	21.20	21.20	1	1	100.0	50	15	30.0	21.20	34.10	0.00	4.42	38.2
P1HEPT	HEPTACHLOR	ug/kg	3	8.50	8.50	1	1	100.0	50	9	18.0	8.50	4.70	0.00	2.20	23.5
P1PPDR	PP-DDE	ug/kg	1	4.20	4.20	1	1	100.0	50	34	68.0	4.20	11.10	0.00	2.72	73.5
P245T	2,4,5-TRICHLOROPHENOXYACETIC ACID	ug/kg	3	360.90	360.90	1	1	100.0	50	16	32.0	360.90	84.40	0.00	3.13	41.2
P24D	2,4-DICHLOROPHENOXYACETIC ACID	ug/kg	3	679.40	679.40	1	1	100.0	50	25	50.0	679.40	75.00	0.00	5.81	64.7
P35IL	SILVEX	ug/kg	3	191.10	191.10	1	1	100.0	50	18	36.0	191.10	92.70	0.00	2.94	44.1
X1HCCP	HEXACHLOROCYCLOPENTADIENE	ug/kg	3	27.60	27.60	1	1	100.0	50	8	16.0	27.60	34.20	0.00	2.76	23.5
X2HCB	HEXACHLOROBENZENE	ug/kg	2	8.50	8.50	1	1	100.0	50	21	42.0	8.50	7.00	0.00	2.96	55.9

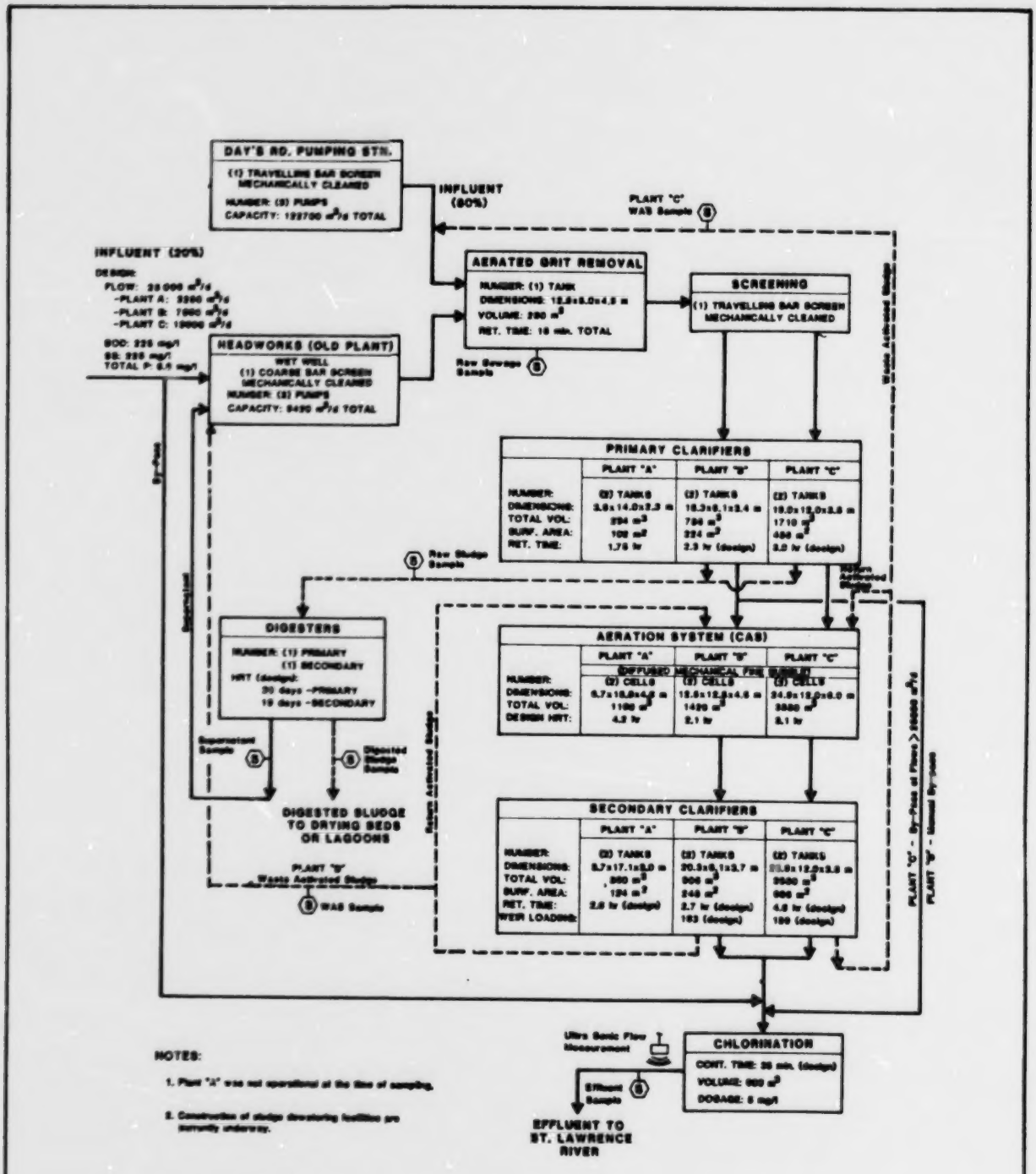
Sub-Appendix A-9

Kingston Township WPCP

Contents:

- Plant Schematic with Design Characteristics
- Annual Data Review (1981 - 1986 Plant Performance)
- Sources of Municipal Water Pollution Control Plant Raw Sewage
- Operational Evaluation for Kingston Township WPCP
- Analytical Data

(KIR18/28A)



KINGSTON TOWNSHIP WPCP

CANVIRO

KINGSTON TOWNSHIP WPCP
Conventional Activated Sludge
Phosphorus Removal - Continuous
Capacity - 25.000 10(3)m3/day

PARAMETER	1981	1982	1983	1984	1985	MEAN ANNUAL AVERAGE
Avg. Daily Flow (1000 m3/day)	15.97	16.56	16.25	15.57	16.36	16.14
BOD5 - Influent (mg/L)	275.25	186.75	186.33	208.17	236.83	218.67
BOD5 - Effluent (mg/L)	12.52	9.39	11.55	10.88	10.79	11.03
Annual BOD5 Significantly Different from Mean Annual Average BOD5?	N	N	N	N	N	
TSS - Influent (mg/L)	344.58	214.00	139.75	162.58	312.50	234.68
TSS - Effluent (mg/L)	13.02	7.93	8.63	9.14	8.58	9.46
Annual TSS Significantly Different from Mean Annual Average TSS?	N	N	N	N	N	
Total P - Influent (mg/L)	10.61	7.45	5.46	6.31	6.27	7.22
Total P - Effluent (mg/L)	1.07	0.92	0.92	0.91	0.89	0.94
Annual TP Significantly Different from Mean Annual Average TP?	N	N	N	N	N	
TP in Compliance?	N	Y	Y	Y	Y	Y

I.D. - Insufficient Data

R

SOURCES OF MUNICIPAL WATER POLLUTION CONTROL PLANT RAW SEWAGE

GENERAL DESCRIPTION OF WATER POLLUTION CONTROL PLANT (WPCP)

NAME OF WPCP	KINGSTON TOWNSHIP
WORKS NUMBER	110000365
TREATMENT TYPE	CONVENTIONAL ACTIVATED SLUDGE PHOSPHORUS REMOVAL CONTINUOUS
DESIGN CAPACITY (1000 m3/d)	25.003
1986 AVERAGE DAY FLOW (1000 m3/d)	18.649
POPULATION SERVED	18700

% OF TOTAL FLOW ATTRIBUTED TO:

INDUSTRIAL SOURCES (%)	4
COMMERCIAL SOURCES (%) (Population x 0.0757)	8
RESIDENTIAL SOURCES (%) (Population x 0.175)	18
UNACCOUNTED FOR, INCL. INFILTRATION (100-% Contributed from industrial, commercial and residential sources)	71

PROFILE OF INDUSTRIES IN CATCHMENT

TOTAL NO OF INDUSTRIES	55
INDUSTRIES WITH WATER	24
NO OF SIC CATEGORIES	19

DESCRIPTION OF THE TOP 5 INDUSTRIES DISCHARGED TO THE WPCP (BASED ON WATER USE DATA)

DESCRIPTION	SIC	# OF COMPANIES
COPPER FORMING	3351-3357	1
PLASTICS, RESINS AND SYNTHETICS	2821-2824	3
FIBERS MFG	3271-3273	4
CEMENT MFG	3500-3599	6
MACHINERY MFG	3070-3079	1
PLASTICS MOLDING		

OPERATIONAL EVALUATION FOR: K I N G S T O N T O W N S H I P W P C P

TREATMENT FACILITY: Secondary
PERIOD ENDING: May 24,1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 25,000 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
RAW SEWAGE FLOW	15,820	15,110	14,920	14,810	14,450	14,450	14,450
% of Design Flow	63.28%	60.44%	59.68%	59.24%	57.80%	57.80%	57.80%
Influent BOD (mg/L)		180		378			
Primary BOD (mg/L)				149			
Secondary BOD (mg/L)		4		5			
% PRIMARY REMOVAL				60.6			
% SECONDARY REMOVAL		97.8		98.8			
Influent SS (mg/L)		241		581			
Primary SS (mg/L)				50			
Secondary SS (mg/L)		3		6			
% PRIMARY REMOVAL				91.4			
% SECONDARY REMOVAL		98.8		99.0			
Influent NH4 (mg/L)		19.5					
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)		5.6					
% PRIMARY REMOVAL							
% SECONDARY REMOVAL		71.3					
Influent TKN (mg/L)		44.0					
Primary TKN (mg/L)							
Secondary TKN (mg/L)		8.0					
% PRIMARY REMOVAL							
% SECONDARY REMOVAL		81.8					
Influent Total P (mg/L)		8.7	10.7		10.0		
Primary Total P (mg/L)							
Secondary Total P (mg/L)		0.45	0.46		1.15		
% PRIMARY REMOVAL							
% SECONDARY REMOVAL		94.8	95.7		88.5		

OPERATIONAL EVALUATION FOR: K I N G S T O N T O W N S H I P W P C P

TREATMENT FACILITY: Secondary
PERIOD ENDING: May 24,1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 25,000 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 8	DAY 9	DAY 10	DAY 11	DAY 12	DAY 13	DAY 14
RAW SEWAGE FLOW	15,020	15,010	14,520	16,250	15,610	15,610	15,610
% of Design Flow	60.08%	60.04%	58.08%	65.00%	62.44%	62.44%	62.44%
Influent BOD (mg/L)				334			
Primary BOD (mg/L)				214			
Secondary BOD (mg/L)				4			
% PRIMARY REMOVAL				35.9			
% SECONDARY REMOVAL				98.8			
Influent SS (mg/L)				240			
Primary SS (mg/L)				57			
Secondary SS (mg/L)				4			
% PRIMARY REMOVAL				76.3			
% SECONDARY REMOVAL				98.5			
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)							
Primary Total P (mg/L)							
Secondary Total P (mg/L)		0.63					
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							

OPERATIONAL EVALUATION FOR: K I N G S T O N T O W N S H I P W P C P

TREATMENT FACILITY: Secondary
PERIOD ENDING: May 24,1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 25,000 m3/d

PARAMETER	SAMPLING PERIOD DAY 15	DAY 16	DAY 17	DAY 18	DAY 19	DAY 20	DAY 21
RAW SEWAGE FLOW	15,410	15,190	15,350	14,620	15,420	15,420	15,420
% of Design Flow	61.64%	60.76%	61.40%	58.48%	61.68%	61.68%	61.68%
Influent BOD (mg/L)							
Primary BOD (mg/L)							
Secondary BOD (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent SS (mg/L)							
Primary SS (mg/L)							
Secondary SS (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)		4.3			4.4		
Primary Total P (mg/L)							
Secondary Total P (mg/L)		0.95			0.60		
% PRIMARY REMOVAL							
% SECONDARY REMOVAL		77.9			86.4		

PLANT NAME : Kingston Twp
PLANT TYPE : Secondary

SAMPLING TYPE : Raw Sewage
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	PLANT MIN. CONC. > . DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0	235.00	498.00	5	5	100.0	267	266	99.6	335.92	140.23	1.31	1.93	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0	714.00	1260.00	5	5	100.0	260	258	99.2	964.29	287.75	1.31	1.82	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0	30.50	67.00	5	5	100.0	271	271	100.0	44.94	22.39	1.35	1.81	100.0
NNHTPR	AMMONIUM,TOTAL FIL.T.REAC.	mg/L	0	30.00	42.50	5	5	100.0	275	274	99.6	33.34	15.37	1.16	1.69	100.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0	37.70	80.00	5	5	100.0	273	273	100.0	56.07	25.44	1.31	1.47	100.0
PH	(-LOG(H+(CONCN))		0	6.90	7.18	5	5	100.0	275	275	100.0	7.02	6.90	1.02	1.05	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0	398.00	541.00	5	5	100.0	267	266	99.6	490.04	126.88	1.13	1.93	100.0
PHNOL	PHENOLICS (4AAP)	mg/L	0	1.50	1.60	5	2	40.0	275	37	13.5	0.52	0.31	2.72	2.05	37.8
NNOTPR	NITRATES,TOTAL FIL.T.REAC.	mg/L	0	0.30	0.30	5	1	20.0	275	28	10.2	0.04	0.05	3.04	2.33	32.4
METALS																
ALUT	ALUMINUM,UNFIL.T.TOTAL	ug/L	0	12000.00	29000.00	6	6	100.0	322	306	95.0	16760.00	1000.10	1.37	2.65	97.3
CUUT	COPPER,UNFIL.T.TOTAL	ug/L	0	170.00	170.00	1	1	100.0	49	48	98.0	170.00	110.60	0.00	2.28	97.1
HGUT	MERCURY,UNFIL.T.TOTAL	ug/L	0	0.49	1.60	5	5	100.0	283	274	96.8	0.80	0.23	1.59	2.11	100.0
SRUT	STRONTIUM,UNFIL.T.TOTAL	ug/L	0	1600.00	1800.00	6	6	100.0	319	318	99.7	1700.00	370.70	1.05	2.14	100.0
ZNUT	ZINC,UNFIL.T.TOTAL	ug/L	0	220.00	410.00	6	6	100.0	322	315	97.8	280.00	211.00	1.24	2.94	100.0
COUT	COBALT,UNFIL.T.TOTAL	ug/L	0	50.00	70.00	6	3	50.0	322	82	25.5	20.00	9.50	3.90	2.31	83.8
CDUT	CADMIUM,UNFIL.T.TOTAL	ug/L	0	10.00	20.00	6	2	33.3	322	76	23.6	10.00	6.50	1.74	2.09	70.3
AGUT	SILVER,UNFIL.T.TOTAL	ug/L	0	30.00	30.00	6	1	16.7	321	82	25.6	10.00	10.40	2.08	2.55	75.7
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PMMCRE	M-CRESOL	ug/L	1	214.90	758.30	5	4	80.0	275	167	60.7	192.00	25.59	6.48	3.45	86.5
PMPHEN	PHENOL	ug/L	2	40.10	103.70	5	4	80.0	275	118	42.9	45.72	14.52	2.95	2.46	78.4
PESTICIDES,HERBICIDES,PCBS																
P1BHCG	GAMMA-BHC(1#)(CHLORCYCLOHEXANE)	ug/L	2	0.02	0.05	5	4	80.0	276	143	51.8	0.02	0.02	1.89	2.29	94.6
P524D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	0.04	0.46	5	4	80.0	276	214	77.5	0.11	0.13	3.71	3.72	100.0
P1CHLG	GAMMA-CHLORDANE	ug/L	1	0.02	0.06	5	3	60.0	276	9	3.3	0.02	0.01	2.15	1.49	16.2
P1PPDE	PP-DDE	ug/L	1	0.02	0.02	5	3	60.0	276	15	5.4	0.02	0.01	1.46	1.74	26.3
P1PCBT	PCB, TOTAL	ug/L	2	0.52	0.64	5	2	40.0	276	42	15.2	0.14	0.06	3.84	2.31	46.0
P5SILV	SILVEX	ug/L	3	0.27	0.47	5	2	40.0	276	28	10.1	0.10	0.06	3.49	1.68	40.5
P1CHLA	ALPHA-CHLORDANE	ug/L	1	0.04	0.04	5	1	20.0	276	7	2.5	0.01	0.01	1.86	1.46	13.5
P1DIEL	DIELDRIN	ug/L	2	0.03	0.03	5	1	20.0	276	8	2.9	0.01	0.01	1.63	1.28	18.9
P245T	2,4,5-TRICLORPHENOXYACETIC ACID	ug/L	3	0.71	0.71	5	1	20.0	276	22	8.0	0.07	0.06	3.67	1.60	37.8
X1HCCP	HEXACHLOROCYCLOPENTADIENE	ug/L	3	0.17	0.17	5	1	20.0	276	5	1.8	0.11	0.10	1.27	1.30	13.5
VOLATILES ORGANIC COMPOUNDS																
X1CHLO	CHLOROFORM	ug/L	1	76.00	80.00	5	3	60.0	274	28	10.2	45.13	23.90	2.10	1.75	32.4

PLANT NAME : Kingston Twp
PLANT TYPE : Secondary

SAMPLING TYPE : Final Effluent
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	STD. FOR SURFACE WATER	STD. REF.	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET.	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																		
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0		-	4.60	13.60	5	5	100.0	213	211	99.1	8.10	21.22	1.56	2.07	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0		-	24.00	108.00	5	5	100.0	213	211	99.1	39.96	52.80	1.78	1.83	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0		-	6.80	7.80	5	5	100.0	220	220	100.0	7.43	8.09	1.06	1.60	100.0
NNHTFR	AMMONIUM,TOTAL FILT.REAC.	mg/L	0		-	6.25	14.10	5	5	100.0	225	204	91.5	10.64	3.90	1.37	6.98	100.0
NNO2FR	NITRITE,FILT. REACT.	mg/L	0		-	0.68	0.74	5	5	100.0	220	194	88.2	0.56	0.22	1.19	5.95	96.4
NNOTFR	NITRATES,TOTAL FILT.REAC.	mg/L	0		-	15.10	18.80	5	5	100.0	234	186	83.0	17.07	2.33	1.09	7.75	96.4
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0		-	6.40	24.90	5	5	100.0	222	222	100.0	12.16	7.97	1.63	2.71	100.0
PH	(-LOG(H+(CONC'D))		0		-	7.10	7.56	5	5	100.0	224	224	100.0	7.31	7.10	1.03	1.05	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0		-	3.50	5.70	5	5	100.0	220	219	99.6	4.33	10.12	1.23	2.00	100.0
PHENOL	PHENOLICS (4AAP)	mg/L	0	0.00	ONT-MOE	0.14	0.14	5	1	20.0	225	33	14.7	0.08	0.07	2.12	1.86	53.6
METALS																		
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	75.00	ONT-MOE	180.00	980.00	6	6	100.0	264	196	74.2	270.00	101.70	1.90	3.72	96.4
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	0.20	ONT-MOE	0.01	0.01	5	5	100.0	233	220	94.4	0.01	0.03	1.00	2.62	100.0
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	5750.00	ONT-MOE	1000.00	4500.00	6	6	100.0	267	267	100.0	1470.00	340.90	1.75	2.14	100.0
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	30.00	ONT-MOE	20.00	130.00	6	6	100.0	267	262	98.1	40.00	53.30	1.92	2.48	100.0
AGUT	SILVER,UNFILT.TOTAL	ug/L	0	0.10	ONT-MOE	10.00	40.00	6	4	66.7	267	15	5.6	10.00	6.90	2.14	1.84	32.1
COUT	COBALT,UNFILT.TOTAL	ug/L	0	5.00	NYS-STD	10.00	10.00	6	1	16.7	266	65	24.4	10.00	6.40	1.33	1.54	82.1
PESTICIDES,HERBICIDES,PCBS																		
P1BHCG	GAMMA-BHC(HEXCHLORCYCLHEXANE)	ug/L	2	0.06	ONT-MOE	0.02	0.06	5	5	100.0	227	157	69.2	0.03	0.02	1.67	2.48	96.4
P24D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	4.00	ONT-MOE	0.09	0.21	5	4	80.0	227	177	78.0	0.09	0.08	3.47	4.71	100.0
P1PPDE	PP-DDE	ug/L	1	0.00	ONT-MOE	0.01	0.01	5	1	20.0	227	7	3.1	0.01	0.01	1.36	1.28	17.9
VOLATILES ORGANIC COMPOUNDS																		
X1TETR	TETRACHLOROETHYLENE	ug/L	1	0.70	NYS-GUL	7.90	7.90	5	1	20.0	234	18	8.0	1.51	1.18	2.52	1.93	32.1

PLANT NAME : Kingston Twp
PLANT TYPE : Secondary

SAMPLING TYPE : Recycle
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	PLANT MIN. CONC. > ND.L	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0	1800.00	2330.00	2	2	100.0	20	20	100.0	2047.93	905.21	1.20	2.32	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0	108.00	24400.00	4	4	100.0	39	39	100.0	4694.20	3439.26	12.71	4.55	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0	90.00	105.00	4	4	100.0	42	42	100.0	98.12	77.62	1.06	3.34	100.0
NNHTPR	AMMONIUM,TOTAL PR.T.REAC.	mg/L	0	218.00	271.00	4	4	100.0	44	44	100.0	243.50	146.20	1.11	2.07	100.0
NNO2PR	NITRITE,FILT. REACT.	mg/L	0	0.05	0.10	4	4	100.0	42	36	85.7	0.07	0.05	1.33	3.13	100.0
NNOTPR	NITRATES,TOTAL FILT.REAC.	mg/L	0	0.50	0.55	4	4	100.0	44	39	88.6	0.51	0.41	1.05	2.66	100.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0	475.00	688.00	4	4	100.0	42	42	100.0	579.46	324.28	1.17	1.95	100.0
PH	(-LOG(H+(CONCN))		0	7.11	7.20	4	4	100.0	44	44	100.0	7.15	6.94	1.01	1.05	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0	6880.00	9200.00	4	4	100.0	42	42	100.0	7771.93	2242.77	1.15	3.60	100.0
PHNOL	PHENOLICS (4AAP)	mg/L	0	0.57	3.60	4	3	75.0	44	11	25.0	1.01	0.41	3.34	3.16	55.6
METALS																
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	63000.00	290000.00	5	5	100.0	53	53	100.0	205990.00	28798.20	1.94	4.42	100.0
CAUT	CALCIUM,UNFILT.TOTAL	ug/L	0	260000.00	340000.00	5	5	100.0	54	54	100.0	302810.00	208447.60	1.11	1.87	100.0
CUUT	COPPER,UNFILT.TOTAL	ug/L	0	3000.00	3000.00	1	1	100.0	12	12	100.0	3000.00	1814.00	0.00	5.64	100.0
FEUT	IRON,UNFILT.TOTAL	ug/L	0	8300.00	42000.00	5	5	100.0	53	53	100.0	27920.00	109943.30	1.99	4.19	100.0
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	0.98	13.00	4	4	100.0	47	44	93.6	6.06	1.68	3.39	4.49	100.0
MGUT	MAGNESIUM,UNFILT.TOTAL	ug/L	0	44000.00	53000.00	5	5	100.0	54	54	100.0	49310.00	41620.20	1.07	1.78	100.0
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	1700.00	9300.00	5	5	100.0	53	53	100.0	5770.00	1347.00	2.00	2.13	100.0
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	840.00	4300.00	5	5	100.0	53	53	100.0	2750.00	3112.40	1.96	7.41	100.0
ASUT	ARSENIC,UNFILT.TOTAL	ug/L	0	30.00	50.00	5	4	80.0	51	27	52.9	30.00	37.50	1.57	2.92	66.7
CDUT	CADMIUM,UNFILT.TOTAL	ug/L	0	30.00	110.00	5	4	80.0	53	37	69.8	60.00	58.40	1.99	6.63	77.8
SEUT	SELENIUM,UNFILT.TOTAL	ug/L	0	30.00	50.00	5	4	80.0	51	25	49.0	30.00	44.20	1.54	3.52	55.6
CCNPUR	CYANIDE-FREE,UNFILT.REAC.	ug/L	0	10.00	20.00	4	3	75.0	43	17	39.5	0.00	4.00	4.73	5.19	66.7
AGUT	SILVER,UNFILT.TOTAL	ug/L	0	30.00	160.00	5	3	60.0	53	42	79.3	50.00	72.30	2.30	4.09	100.0
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	40.00	280.00	5	3	60.0	53	51	96.2	90.00	874.70	2.39	6.11	100.0
PBUT	LEAD,UNFILT.TOTAL	ug/L	0	120.00	590.00	5	3	60.0	53	36	67.9	300.00	429.50	1.94	6.62	100.0
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PMMCRE	M-CRESOL	ug/L	1	2.10	4700.00	4	4	100.0	43	27	62.8	404.78	562.69	34.55	5.65	88.9
PMPHEN	PHENOL	ug/L	2	167.20	167.20	4	1	25.0	43	5	11.6	154.13	124.37	1.06	2.60	33.3
PESTICIDES,HERBICIDES,PCBS																
P1CHLA	ALPHA-CHLORDANE	ug/L	1	0.06	0.20	4	4	100.0	44	11	25.0	0.10	0.06	1.73	2.96	55.6
P1CHLG	GAMMA-CHLORDANE	ug/L	1	0.07	0.30	4	4	100.0	44	11	25.0	0.13	0.06	1.95	2.70	44.4
P1PPDE	PP-DDE	ug/L	1	0.06	0.30	4	4	100.0	44	17	38.6	0.12	0.07	2.04	3.59	55.6
P1PPDD	PP-DDD	ug/L	1	0.03	0.05	4	3	75.0	44	10	22.7	0.05	0.05	1.77	2.86	66.7
P24D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	1.20	2.70	4	3	75.0	44	29	65.9	1.74	0.79	1.44	5.21	88.9
X2124	1,2,4-TRICHLOROBENZENE	ug/L	3	0.10	0.18	4	3	75.0	44	15	34.1	0.12	0.11	1.34	4.17	44.4
P1BHCG	GAMMA-BHC(HEXCHLORCYCLOHEXANE)	ug/L	2	0.03	0.04	4	2	50.0	44	17	38.6	0.06	0.08	1.86	2.57	66.7
P1MIRX	MIREX	ug/L	1	0.03	0.04	4	2	50.0	44	3	6.8	0.06	0.05	1.86	3.00	22.2
P1PCBT	PCB, TOTAL	ug/L	2	4.40	12.00	4	2	50.0	44	27	61.4	1.78	0.77	5.34	7.58	77.8
P1DIEL	DIELDRIN	ug/L	2	0.20	0.20	4	1	25.0	44	7	15.9	0.07	0.06	3.70	2.81	55.6
P1HEPT	HEPTACHLOR	ug/L	3	0.03	0.03	4	1	25.0	44	9	20.5	0.07	0.07	1.83	3.83	44.4
P5SILV	SILVEX	ug/L	3	0.74	0.74	4	1	25.0	44	15	34.1	0.55	0.38	6.62	5.08	66.7
X2HCB	HEXACHLOROBENZENE	ug/L	2	0.03	0.03	4	1	25.0	44	12	27.3	0.07	0.07	1.83	4.31	66.7

PLANT NAME : Kingston Twp
PLANT TYPE : Secondary

SAMPLING TYPE : Recycle
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	PLANT MIN. CONC. > MDL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
VOLATILES ORGANIC COMPOUNDS																
X1CHLO	CHLOROFORM	ug/L	1	88.00	88.00	4	1	25.0	44	1	2.3	13.70	19.32	6.55	1.66	11.1

PLANT NAME : Kingston Twp.
PLANT TYPE : Secondary

SAMPLING TYPE : Raw Sludge
SAMPLE FORM : Dry Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS (DRY WEIGHT)	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
COD	CHEMICAL OXYGEN DEMAND	mg/kg	0	1697740.11	1697740.11	1	1	100.0	45	45	100.0	1697740.11	892221.45	0.00	3.19	100.0
NNHTPR	AMMONIUM,TOTAL FILT.REAC.	mg/kg	0	6892.66	6892.66	1	1	100.0	48	47	97.9	6892.66	5911.32	0.00	4.59	100.0
NNOTPR	NITRATES,TOTAL FILT.REAC.	mg/kg	0	14.12	14.12	1	1	100.0	48	43	89.6	14.12	25.44	0.00	2.21	93.9
NNTKUR	NITROGEN-TOT-KJEL.,UNF.TOT	mg/kg	0	46610.17	46610.17	1	1	100.0	51	51	100.0	46610.17	36897.85	0.00	2.98	100.0
PH	(-LOG(H+(CONCN))	mg/kg	0	5.63	5.63	1	1	100.0	49	49	100.0	5.63	6.03	0.00	1.10	100.0
PHENOL	PHENOLICS (4AAP)	mg/kg	0	59.32	59.32	1	1	100.0	50	41	82.0	59.32	82.34	0.00	3.54	85.3
RST	RESIDUE, TOTAL	mg/kg	0	35400.00	35400.00	1	1	100.0	51	51	100.0	35400.00	32783.51	0.00	1.81	100.0
RSTLOI	RESIDUE,TOT.LOSS ON IGNI.	mg/kg	0	25500.00	25500.00	1	1	100.0	51	51	100.0	25500.00	20803.05	0.00	1.77	100.0
METALS																
ALUT	ALUMINUM,UNFILT TOTAL.	mg/kg	0	19774.01	19774.01	1	1	100.0	51	51	100.0	19774.01	9835.74	0.00	2.51	100.0
ASUT	ARSENIC,UNFILT TOTAL.	mg/kg	0	3.11	3.11	1	1	100.0	51	50	98.0	3.11	6.13	0.00	2.01	97.1
CDUT	CADMIUM,UNFILT TOTAL.	mg/kg	0	2.06	2.06	1	1	100.0	43	40	93.0	2.06	9.74	0.00	4.35	90.0
CUUT	COPPER,UNFILT.TOTAL.	mg/kg	0	338.98	338.98	1	1	100.0	46	46	100.0	338.98	606.31	0.00	1.72	100.0
HGUT	MERCURY,UNFILT TOTAL.	mg/kg	0	3.39	3.39	1	1	100.0	50	50	100.0	3.39	2.23	0.00	1.67	100.0
PBUT	LEAD,UNFILT TOTAL.	mg/kg	0	144.07	144.07	1	1	100.0	49	48	98.0	144.07	173.99	0.00	2.24	96.9
SEUT	SELENIUM,UNFILT TOTAL.	mg/kg	0	3.67	3.67	1	1	100.0	50	48	96.0	3.67	3.04	0.00	1.93	93.9
SRUT	STRONTIUM,UNFILT.TOTAL.	mg/kg	0	875.71	875.71	1	1	100.0	51	51	100.0	875.71	231.70	0.00	1.97	100.0
ZNUT	ZINC,UNFILT TOTAL.	mg/kg	0	508.47	508.47	1	1	100.0	51	51	100.0	508.47	905.39	0.00	2.39	100.0
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PMMCRE	M-CRESOL	ug/kg	1	985.90	985.90	1	1	100.0	51	42	82.3	985.90	116847.30	0.00	12.16	85.3
DIOXINS AND FURANS																
P86CDD	OCTACHLORODIBENZODIOXIN	ug/kg	1	7.30	7.30	1	1	100.0	50	25	50.0	7.30	8.50	0.00	3.60	58.8
PESTICIDES,HERBICIDES,PCBS																
P1BHCG	GAMMA-BHC(HEXACHLORCYCLOHEXANE)	ug/kg	2	11.30	11.30	1	1	100.0	51	28	54.9	11.30	8.90	0.00	2.69	67.7
P1CHLA	ALPHA-CHLORDANE	ug/kg	1	11.30	11.30	1	1	100.0	51	18	35.3	11.30	5.90	0.00	2.38	47.1
P1CHLG	GAMMA-CHLORDANE	ug/kg	1	11.30	11.30	1	1	100.0	51	19	37.3	11.30	6.00	0.00	2.44	50.0
P1DIEL	DIELDRIN	ug/kg	2	42.40	42.40	1	1	100.0	51	20	39.2	42.40	7.20	0.00	3.10	50.0
P1DMDT	METHOXYCHLOR	ug/kg	1	28.20	28.20	1	1	100.0	51	19	37.3	28.20	45.80	0.00	5.15	44.1
P1ENDR	ENDRIN	ug/kg	3	5.60	5.60	1	1	100.0	51	8	15.7	5.60	4.20	0.00	2.21	23.5
P1PCBT	PCB, TOTAL	ug/kg	2	423.70	423.70	1	1	100.0	51	40	78.4	423.70	88.70	0.00	3.18	79.4
P1PPDE	PP-DDE	ug/kg	1	11.30	11.30	1	1	100.0	51	22	43.1	11.30	7.30	0.00	2.31	52.9
P1PPDT	PP-DDT	ug/kg	1	200.60	200.60	1	1	100.0	51	38	74.5	200.60	93.20	0.00	6.50	82.3
P24D	2,4-DICHLOROPHENOXYACETIC ACID	ug/kg	3	79.10	79.10	1	1	100.0	51	25	45.1	79.10	47.30	0.00	3.40	55.9
P3SILV	SILVEX	ug/kg	3	16.90	16.90	1	1	100.0	51	17	33.3	16.90	9.30	0.00	4.06	41.2
X2124	1,2,4-TRICHLOROBENZENE	ug/kg	3	16.90	16.90	1	1	100.0	51	17	33.3	16.90	9.30	0.00	4.06	41.2
VOLATILES ORGANIC COMPOUNDS																

PLANT NAME : Kingston Twp.
PLANT TYPE : Secondary

SAMPLING TYPE : Treated Sludge
SAMPLE FORM : Dry Weight

CONTAM-INANT	CONTAMINANT NAME	UNITSQA/QC (DRY WEIGHT)	CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
COD	CHEMICAL OXYGEN DEMAND	mg/kg	0	1223602.48	1223602.48	1	1	100.0	36	36	100.0	1223602.48	508097.94	0.00	4.65	100.0
NNOTPR	NITRATES,TOTAL.FIL.T REAC.	mg/kg	0	25.88	25.88	1	1	100.0	26	23	88.5	25.88	42.68	0.00	2.29	95.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/kg	0	48654.24	48654.24	1	1	100.0	49	49	100.0	48654.24	38494.12	0.00	1.77	100.0
PH	(-LOG(H+(CONCN))	mg/kg	0	7.33	7.33	1	1	100.0	47	47	100.0	7.33	7.17	0.00	1.09	100.0
PHNOL	PHENOLICS (4AAP)	mg/kg	0	118.01	118.01	1	1	100.0	49	41	83.7	118.01	43.05	0.00	3.14	87.9
RST	RESIDUE, TOTAL	mg/kg	0	48300.00	48300.00	1	1	100.0	50	50	100.0	48300.00	80434.04	0.00	3.23	100.0
RSTLOI	RESIDUE,TOT.LOSS ON IGNI.	mg/kg	0	29000.00	29000.00	1	1	100.0	50	50	100.0	29000.00	45379.33	0.00	3.19	100.0
METALS																
AGUT	SILVER,UNFIL.T.TOTAL.	mg/kg	0	14.49	14.49	1	1	100.0	44	44	100.0	14.49	37.78	0.00	2.33	100.0
ALUT	ALUMINUM,UNFIL.T.TOTAL.	mg/kg	0	43478.26	43478.26	1	1	100.0	50	50	100.0	43478.26	10715.94	0.00	2.82	100.0
ASUT	ARSENIC,UNFIL.T.TOTAL.	mg/kg	0	3.11	3.11	1	1	100.0	50	49	98.0	3.11	5.40	0.00	2.06	97.1
CDUT	CADMIUM,UNFIL.T.TOTAL.	mg/kg	0	3.73	3.73	1	1	100.0	45	41	91.1	3.73	10.47	0.00	3.98	90.3
COUT	COBALT,UNFIL.T.TOTAL.	mg/kg	0	3.73	3.73	1	1	100.0	39	32	82.1	3.73	9.14	0.00	2.75	85.7
CRUT	CHROMIUM,UNFIL.T.TOTAL.	mg/kg	0	78.67	78.67	1	1	100.0	50	50	100.0	78.67	333.06	0.00	3.59	100.0
CUUT	COPPER,UNFIL.T.TOTAL.	mg/kg	0	331.26	331.26	1	1	100.0	45	45	100.0	331.26	732.24	0.00	2.16	100.0
HGUT	MERCURY,UNFIL.T.TOTAL.	mg/kg	0	1.24	1.24	1	1	100.0	50	49	98.0	1.24	3.24	0.00	2.04	97.1
NIUT	NICKEL,UNFIL.T.TOTAL.	mg/kg	0	15.11	15.11	1	1	100.0	45	42	93.3	15.11	72.95	0.00	2.95	90.0
PBUT	LEAD,UNFIL.T.TOTAL.	mg/kg	0	149.07	149.07	1	1	100.0	50	49	98.0	149.07	196.62	0.00	2.46	97.1
SEUT	SELENIUM,UNFIL.T.TOTAL.	mg/kg	0	7.66	7.66	1	1	100.0	50	48	96.0	7.66	2.67	0.00	2.98	97.1
SRUT	STRONTIUM,UNFIL.T.TOTAL.	mg/kg	0	1366.46	1366.46	1	1	100.0	50	50	100.0	1366.46	240.93	0.00	2.54	100.0
ZNUT	ZINC,UNFIL.T.TOTAL.	mg/kg	0	786.75	786.75	1	1	100.0	50	50	100.0	786.75	988.90	0.00	2.57	100.0
	PESTICIDES,HERBICIDES,PCBS															
P1CHLA	ALPHA-CHLORDANE	ug/kg	1	10.40	10.40	1	1	100.0	50	22	44.0	10.40	6.50	0.00	2.41	55.9
P1CHLG	GAMMA-CHLORDANE	ug/kg	1	10.40	10.40	1	1	100.0	50	21	42.0	10.40	6.80	0.00	2.58	52.9
P1DIEL	DIELDRIN	ug/kg	2	20.70	20.70	1	1	100.0	50	15	30.0	20.70	6.50	0.00	3.51	38.2
P1HEPE	HEPTACHLOREPOXIDE	ug/kg	2	6.20	6.20	1	1	100.0	50	10	20.0	6.20	5.20	0.00	2.86	23.5
P1PCBT	PCB, TOTAL.	ug/kg	2	372.70	372.70	1	1	100.0	50	32	64.0	372.70	114.10	0.00	4.58	67.7
P1PPDE	PP-DDE	ug/kg	1	10.40	10.40	1	1	100.0	50	34	68.0	10.40	11.10	0.00	2.72	73.5
X2124	1,2,4-TRICHLOROBENZENE	ug/kg	3	29.00	29.00	1	1	100.0	50	22	44.0	29.00	14.80	0.00	5.02	52.9

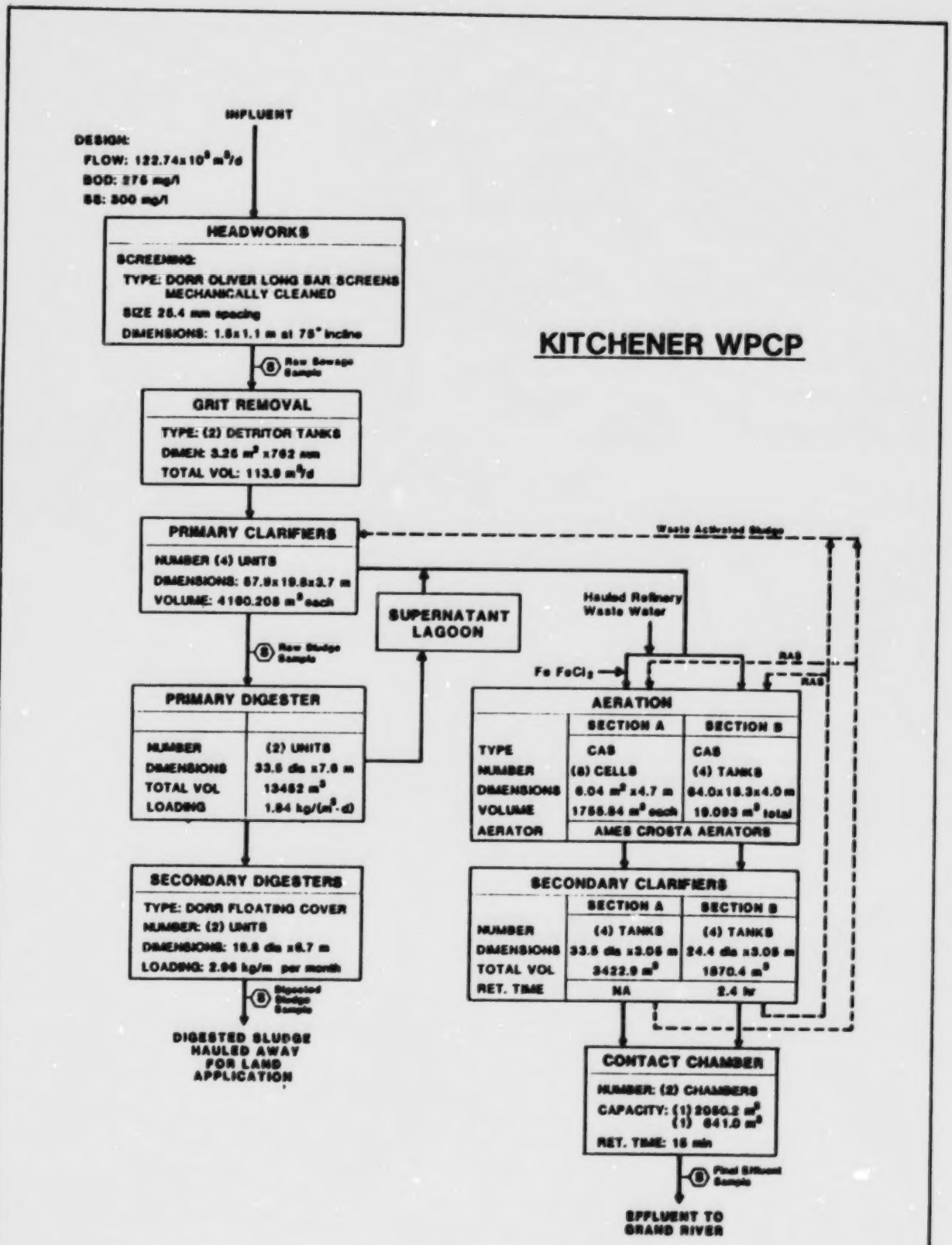
Sub-Appendix A-10

Kitchener WPCP

Contents:

- Plant Schematic with Design Characteristics
- Annual Data Review (1981 - 1986 Plant Performance)
- Sources of Municipal Water Pollution Control Plant Raw Sewage
- Operational Evaluation for Kitchener WPCP
- Analytical Data

(KIR18/28A)


KITCHENER WPCP
INFLUENT
DESIGN:
FLOW: 122.74x10³ m³/d
BOD: 275 mg/l
SS: 300 mg/l
HEADWORKS
SCREENING:
TYPE: DORR OLIVER LONG BAR SCREENS MECHANICALLY CLEANED
SIZE 25.4 mm spacing
DIMENSIONS: 1.8x1.1 m at 75° incline
Raw Sewage Sample
GRIT REMOVAL
TYPE: (2) DETRITOR TANKS
DIMEN: 3.25 m² x762 mm
TOTAL VOL: 113.9 m³/d
PRIMARY CLARIFIERS
NUMBER (4) UNITS
DIMENSIONS: 57.9x19.8x3.7 m
VOLUME: 4180.208 m³ each
Waste Activated Sludge
SUPERNATANT LAGOON
Hauled Refinery Waste Water
Raw Sludge Sample
Fe FeCl₃
RAS
RAS
PRIMARY DIGESTER
NUMBER (2) UNITS
DIMENSIONS 33.5 dia x7.6 m
TOTAL VOL 13462 m³
LOADING 1.84 kg/(m³·d)
AERATION
SECTION A
SECTION B
TYPE CAS CAS
NUMBER (6) CELLS (4) TANKS
DIMENSIONS 6.04 m² x4.7 m 64.0x18.3x4.0 m
VOLUME 1755.84 m³ each 19,093 m³ total
AERATOR AMES CROSTA AERATORS
SECONDARY DIGESTERS
TYPE: DORR FLOATING COVER
NUMBER: (2) UNITS
DIMENSIONS: 18.8 dia x6.7 m
LOADING: 2.96 kg/m per month
SECONDARY CLARIFIERS
SECTION A
SECTION B
NUMBER (4) TANKS (4) TANKS
DIMENSIONS 33.5 dia x3.05 m 24.4 dia x3.05 m
TOTAL VOL 3422.9 m³ 1870.4 m³
RET. TIME NA 2.4 hr
Digested Sludge Sample
DIGESTED SLUDGE HAULED AWAY FOR LAND APPLICATION
CONTACT CHAMBER
NUMBER: (2) CHAMBERS
CAPACITY: (1) 2050.2 m³
(1) 641.0 m³
RET. TIME: 15 min
Final Effluent Sample
EFFLUENT TO GRAND RIVER
CANVIRO

KITCHENER WPCP
Conventional Activated Sludge
Phosphorus Removal - Continuous
Capacity - 122.742 10(3)m3/day

PARAMETER	1981	1982	1983	1984	1985	MEAN ANNUAL AVERAGE
Avg. Daily Flow (1000 m3/day)	62.25	63.00	66.01	68.56	64.46	64.86
BOD5 - Influent (mg/L)	251.00	258.17	255.75	288.42	226.67	254.42
BOD5 - Effluent (mg/L)	9.54	6.38	5.55	5.42	7.44	6.87
Annual BOD5 Significantly Different from Mean Annual Average BOD5?	Y	N	N	N	N	
TSS - Influent (mg/L)	277.50	245.93	249.33	227.33	216.17	243.25
TSS - Effluent (mg/L)	9.25	6.92	8.29	6.25	5.16	7.17
Annual TSS Significantly Different from Mean Annual Average TSS?	N	N	N	N	Y	
Total P - Influent (mg/L)	7.57	7.02	7.49	6.96	6.98	7.20
Total P - Effluent (mg/L)	0.80	0.84	0.87	0.69	0.76	0.79
Annual TP Significantly Different from Mean Annual Average TP?	N	N	N	N	N	
TP in Compliance?	Y	Y	Y	Y	Y	Y

I.D. - Insufficient Data

R

SOURCES OF MUNICIPAL WATER POLLUTION CONTROL PLANT RAW SEWAGE

GENERAL DESCRIPTION OF WATER POLLUTION CONTROL PLANT (WPCP)

NAME OF WPCP	KITCHENER WPCP
WORKS NUMBER	110000374
TREATMENT TYPE	CONVENTIONAL ACTIVATED SLUDGE PHOSPHORUS REMOVAL CONTINUOUS
DESIGN CAPACITY (1000 m3/d)	122.742
1986 AVERAGE DAY FLOW (1000 m3/d)	64.462
POPULATION SERVED	138271

% OF TOTAL FLOW ATTRIBUTED TO:

INDUSTRIAL SOURCES (%)	39
COMMERCIAL SOURCES (%) (Population x 0.0757)	16
RESIDENTIAL SOURCES (%) (Population x 0.175)	38
UNACCOUNTED FOR, INCL. INFILTRATION (100-% Contributed from industrial, commercial and residential sources)	7

PROFILE OF INDUSTRIES IN CATCHMENT

TOTAL NO OF INDUSTRIES	308
INDUSTRIES WITH WATER	122
NO OF SIC CATEGORIES	38

DESCRIPTION OF THE TOP 5 INDUSTRIES DISCHARGED TO THE WPCP (BASED ON WATER USE DATA)

DESCRIPTION	SIC	# OF COMPANIES
MEAT	2011-2013	5
RUBBER MFG/PROCESSING	3011-3069	5
TEXTILE PRODUCTS	2271-2299	3
METAL FINISHING	3411-3469	30
WOOD,METAL FURNITURE MFG	2510-2599	11

R

OPERATIONAL EVALUATION FOR: K I T C H E N E R W P C P

TREATMENT FACILITY: Secondary
PERIOD ENDING: July 26, 1987 (7-day Sampling)
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 122,745 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
RAW SEWAGE FLOW	74,756	83,829	111,654	90,382	82,717	70,947	61,373
% of Design Flow	60.90%	68.30%	90.96%	73.63%	67.39%	57.80%	50.00%
Influent BOD (mg/L)	185.0	172.0					
Primary BOD (mg/L)	171.0		14.2				
Secondary BOD (mg/L)	13.6		21.8				
% PRIMARY REMOVAL	7.6%						
% SECONDARY REMOVAL	92.6%						
Influent SS (mg/L)	229.0	228.0	283.0	171.0	172.0		
Primary SS (mg/L)	144.0	138.0	109.0	144.0	114.0		
Secondary SS (mg/L)	5.0	4.0	8.0	4.0	4.0		
% PRIMARY REMOVAL	37.1%	39.5%	61.5%	15.8%	33.7%		
% SECONDARY REMOVAL	97.8%	98.2%	97.2%	97.7%	97.7%		
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)	5.40		3.60		5.90		
Primary Total P (mg/L)							
Secondary Total P (mg/L)	1.15		1.15		1.15		
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	78.7%		68.1%		80.5%		

NOTE : 40% of Primary Influent to Plant 1, 60% to Plant 2.

OPERATIONAL EVALUATION FOR: K I T C H E N E R W P C P

TREATMENT FACILITY: Secondary
PERIOD ENDING: July 26, 1987 (7-day Sampling)
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 122,745 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 8	DAY 9	DAY 10	DAY 11	DAY 12	DAY 13	DAY 14
RAW SEWAGE FLOW	76,367	83,398	75,493	73,636	72,237	60,596	52,676
% of Design Flow	62.22%	67.94%	61.50%	59.99%	58.85%	49.37%	42.91%
Influent BOD (mg/L)	230.0		335.0				
Primary BOD (mg/L)	180.0		204.0				
Secondary BOD (mg/L)	8.4		8.1			14.0	
% PRIMARY REMOVAL	21.7%		39.1%				
% SECONDARY REMOVAL	96.3%		97.6%				
Influent SS (mg/L)	180.0	215.0	211.0	218.0	187.0		
Primary SS (mg/L)	126.0	115.0	134.0	135.0	176.0		
Secondary SS (mg/L)	7.0	5.0	5.0	8.0	7.0	7.0	
% PRIMARY REMOVAL	30.0%	46.5%	36.5%	38.1%	5.9%		
% SECONDARY REMOVAL	96.1%	97.7%	97.6%	96.3%	96.3%		
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)						3.85	
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)						6.2	
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)	5.40		6.70		6.30		
Primary Total P (mg/L)							
Secondary Total P (mg/L)	0.86		0.83		0.79	0.97	
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	84.1%		87.6%		87.5%		

NOTE : 40% of Primary Influent to Plant 1, 60% to Plant 2.

OPERATIONAL EVALUATION FOR: K I T C H E N E R W P C P

TREATMENT FACILITY: Secondary
PERIOD ENDING: July 26, 1987 (7-day Sampling)
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 122,745 m3/d

PARAMETER	SAMPLING PERIOD DAY 15	DAY 16	DAY 17	DAY 18	DAY 19	DAY 20	DAY 21
RAW SEWAGE FLOW	75,757	70,868	69,381	69,882	78,615	68,166	56,621
% of Design Flow	61.72%	57.74%	56.52%	56.93%	64.05%	55.53%	46.13%
Influent BOD (mg/L)							
Primary BOD (mg/L)							
Secondary BOD (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent SS (mg/L)	209.0	200.0	198.0	221.0	368.0		
Primary SS (mg/L)	117.0	155.0	155.0	186.0	186.0		
Secondary SS (mg/L)	8.0	6.0	4.0	7.0	6.0		
% PRIMARY REMOVAL	44.0	22.5	21.7	15.8	49.5		
% SECONDARY REMOVAL	96.2	97.0	98.0	96.8	98.4		
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)	5.90		6.30		5.80		
Primary Total P (mg/L)							
Secondary Total P (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							

NOTE : 40% of Primary Influent to Plant 1, 60% to Plant 2.

OPERATIONAL EVALUATION FOR: K I T C H E N E R W P C P

TREATMENT FACILITY: Secondary
PERIOD ENDING: January 23, 1987
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: 122,745 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
RAW SEWAGE FLOW	69,540	71,265	73,084	72,103	70,934	62,729	58,410
% of Design Flow	56.65%	58.06%	59.54%	58.74%	57.79%	51.11%	47.59%
Influent BOD (mg/L)	300.0		325.0				
Primary BOD (mg/L)	184.0		198.0				
Secondary BOD (mg/L)	13.2		12.8				
% PRIMARY REMOVAL	38.7%		39.1%				
% SECONDARY REMOVAL	95.6%		96.1%				
Influent SS (mg/L)	214.0	294.0	272.0	263.0	220.0		
Primary SS (mg/L)	149.0	173.0	130.0	125.0	136.0		
Secondary SS (mg/L)	7.0	4.0	4.0	3.0	4.0		
% PRIMARY REMOVAL	30.4%	41.2%	52.2%	52.5%	38.2%		
% SECONDARY REMOVAL	96.7%	98.6%	98.5%	98.9%	98.2%		
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)	7.20				6.80		
Primary Total P (mg/L)							
Secondary Total P (mg/L)					0.36		
% PRIMARY REMOVAL							
% SECONDARY REMOVAL					94.7%		

NOTE : 50% of Primary Influent to Plant 1, 50% to Plant 2.

OPERATIONAL EVALUATION FOR: K I T C H E N E R W P C P

TREATMENT FACILITY: Secondary
PERIOD ENDING: January 23, 1987
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: 122,745 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 8	DAY 9	DAY 10	DAY 11	DAY 12	DAY 13	DAY 14
RAW SEWAGE FLOW	69,138	70,733	71,560	76,931	73,522	64,984	59,651
% of Design Flow	56.33%	57.63%	58.30%	62.68%	59.90%	52.94%	48.60%
Influent BOD (mg/L)	240.0		260.0				
Primary BOD (mg/L)	212.0		189.0				
Secondary BOD (mg/L)	6.4		19.6			28.9	
% PRIMARY REMOVAL	11.7%		27.3%				
% SECONDARY REMOVAL	97.3%		92.5%				
Influent SS (mg/L)	226.0	263.0	267.0	253.0	214.0		
Primary SS (mg/L)	189.0	217.0	143.0	178.0	130.0		
Secondary SS (mg/L)	2.0	3.0	4.0	3.0	3.0	4.4	
% PRIMARY REMOVAL	16.4%	17.5%	46.4%	29.6%	39.3%		
% SECONDARY REMOVAL	99.1%	98.9%	98.5%	98.8%	98.6%		
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)						8.65	
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)						9.7	
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)	6.10		5.60		6.50		
Primary Total P (mg/L)							
Secondary Total P (mg/L)	0.50		0.43		0.50	0.63	
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	91.8%		92.3%		92.3%		

NOTE : 50% of Primary Influent to Plant 1, 50% to Plant 2.

OPERATIONAL EVALUATION FOR: K I T C H E N E R W P C P

TREATMENT FACILITY: Secondary
PERIOD ENDING: January 23, 1987
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: 122,745 m3/d

PARAMETER	SAMPLING PERIOD DAY 15	DAY 16	DAY 17	DAY 18	DAY 19	DAY 20	DAY 21
RAW SEWAGE FLOW	68,808	69,631	70,075	70,318	69,450		
% of Design Flow	56.06%	56.73%	57.09%	57.29%	56.58%		
Influent BOD (mg/L)	238.0		262.0		352.0	348.0	
Primary BOD (mg/L)	183.0		96.0				
Secondary BOD (mg/L)	6.4		11.8		28.6	16.2	
% PRIMARY REMOVAL	23.1		63.4				
% SECONDARY REMOVAL	97.3		95.5		91.9	95.3	
Influent SS (mg/L)	196.0	205.0	242.0	253.0	213.0	383.0	
Primary SS (mg/L)	152.0	143.0	164.0	223.0	161.0		
Secondary SS (mg/L)	3.0	3.0	5.0	7.0	4.0	3.6	
% PRIMARY REMOVAL	22.4	30.2	32.2	11.9	24.4		
% SECONDARY REMOVAL	98.5	98.5	97.9	97.2	98.1	99.1	
Influent NH4 (mg/L)	34.9		36.0		35.9	33.3	
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)	0.5		5.1		9.3	1.4	
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	98.6		85.8		74.1	95.8	
Influent TKN (mg/L)	44.3		56.0		46.3	53.0	
Primary TKN (mg/L)							
Secondary TKN (mg/L)	2.2		5.6		6.8	4.3	
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	95.0		90.0		85.4	91.9	
Influent Total P (mg/L)	6.30		7.90		7.90	9.15	
Primary Total P (mg/L)							
Secondary Total P (mg/L)	0.54		0.65		0.50	0.70	
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	91.4		91.8		93.7	92.3	

NOTE : 50% of Primary Influent to Plant 1, 50% to Plant 2.

PLANT NAME : Kitchener
PLANT TYPE : Secondary

SAMPLING TYPE : Raw Sewage
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0	76.60	802.00	12	12	100.0	267	266	99.6	258.60	140.23	1.93	1.93	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0	216.00	1620.00	11	11	100.0	260	258	99.2	547.08	287.75	1.94	1.82	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0	15.50	86.90	12	12	100.0	271	271	100.0	30.52	22.39	1.86	1.81	100.0
NNH1FR	AMMONIUM,TOTAL FILT.REAC.	mg/L	0	15.80	36.00	12	12	100.0	275	274	99.6	23.47	15.37	1.40	1.69	100.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0	22.50	57.00	12	12	100.0	273	273	100.0	37.16	25.44	1.37	1.47	100.0
PH	(-LOG(H+(CONCN))		0	6.39	7.51	12	12	100.0	275	275	100.0	6.88	6.90	1.05	1.05	100.0
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/L	0	4.22	10.20	13	13	100.0	248	248	100.0	7.56	5.18	1.31	1.51	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0	110.00	667.00	12	12	100.0	267	266	99.6	236.67	126.88	1.82	1.93	100.0
RSPLOI	RESIDUE,PART.LOSS ON IGNI.	mg/L	0	84.60	217.00	7	7	100.0	90	89	98.9	118.77	100.84	1.49	1.78	100.0
PHNOL	PHENOLICS (4AAP)	mg/L	0	0.92	5.00	12	6	50.0	275	37	13.5	0.66	0.31	2.99	2.05	37.8
NNO2FR	NITRITE,FIL.T. REACT.	mg/L	0	0.03	0.03	12	1	8.3	271	58	21.4	0.00	0.01	2.04	2.98	51.4
METALS																
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	240.00	3600.00	14	14	100.0	322	306	95.0	630.00	1000.10	2.12	2.65	97.3
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	30.00	350.00	14	14	100.0	322	237	73.6	80.00	51.10	2.18	3.44	89.2
CUUT	COPPER,UNFILT.TOTAL	ug/L	0	140.00	220.00	2	2	100.0	49	48	98.0	180.00	110.60	1.38	2.28	97.1
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	1100.00	2250.00	14	14	100.0	319	318	99.7	1340.00	370.70	1.18	2.14	100.0
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	100.00	2100.00	14	14	100.0	322	315	97.8	430.00	211.00	2.26	2.94	100.0
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	0.08	1.30	13	12	92.3	283	274	96.8	0.30	0.23	2.42	2.11	100.0
AGUT	SILVER,UNFILT.TOTAL	ug/L	0	10.00	20.00	14	5	35.7	321	82	25.6	10.00	10.40	1.85	2.55	75.7
COUT	COBALT,UNFILT.TOTAL	ug/L	0	10.00	30.00	14	3	21.4	322	82	25.5	10.00	9.30	2.11	2.31	83.8
CCNFUR	CYANIDE-FREE,UNFILT.REAC.	ug/L	0	10.00	10.00	12	2	16.7	271	82	30.3	0.00	1.90	3.10	6.88	32.4
PBUT	LEAD,UNFILT.TOTAL	ug/L	0	120.00	130.00	14	2	14.3	322	57	17.7	60.00	59.50	1.40	1.86	51.4
MOUT	MOLYBDENUM,UNFILT.TOTAL	ug/L	0	20.00	20.00	14	1	7.1	321	41	12.8	10.00	12.40	1.34	1.72	56.8
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PMMCRE	M-CRESOL	ug/L	1	25.70	291.20	12	12	100.0	275	167	60.7	105.85	25.59	2.06	3.45	96.5
PMPHEN	PHENOL	ug/L	2	17.50	276.20	12	9	75.0	275	118	42.9	40.31	14.52	4.02	2.46	78.4
PESTICIDES,HERBICIDES,PCBS																
P324D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	0.05	2.05	12	5	41.7	276	214	77.5	0.06	0.13	5.31	3.72	100.0
P3SIL.V	SILVEX	ug/L	3	0.15	0.24	12	4	33.3	276	28	10.1	0.08	0.06	1.97	1.68	40.5
P1BHCG	GAMMA-BHC(HEXCHLORCYCLHEXANE)	ug/L	2	0.02	0.06	12	3	25.0	276	143	51.8	0.01	0.02	1.95	2.29	94.6
P1END1	ENDOSULFAN I	ug/L	3	0.03	0.12	12	3	25.0	276	4	1.5	0.02	0.01	2.42	1.30	5.4
P1PPDE	PP-DDE	ug/L	1	0.02	0.09	12	3	25.0	276	15	5.4	0.02	0.01	2.11	1.74	24.3
P1DIEL	DIELDRIN	ug/L	2	0.02	0.04	12	2	16.7	276	8	2.9	0.01	0.01	1.54	1.28	18.9
P1END2	ENDOSULFAN II	ug/L	3	0.10	0.15	12	2	16.7	276	10	3.6	0.02	0.01	2.66	1.42	21.6
P1ENDR	ENDRIN	ug/L	3	0.06	0.25	12	2	16.7	276	5	1.8	0.02	0.01	2.78	1.34	10.8
P1PPDD	PP-DDD	ug/L	1	0.04	0.34	12	2	16.7	276	6	2.2	0.02	0.01	2.88	1.38	13.5
P1PPDT	PP-DDT	ug/L	3	0.13	0.95	12	2	16.7	276	9	3.3	0.06	0.04	2.58	1.35	18.9
P3245T	2,4,5-TRICLORPHENOXYACETIC ACID	ug/L	3	0.46	0.51	12	2	16.7	276	22	8.0	0.07	0.06	2.42	1.60	37.8
P1CHLA	ALPHA-CHLORDANE	ug/L	1	0.02	0.02	12	1	8.3	276	7	2.5	0.01	0.01	1.22	1.46	13.5
P1CHLG	GAMMA-CHLORDANE	ug/L	1	0.05	0.05	12	1	8.3	276	9	3.3	0.01	0.01	1.59	1.49	16.2
P1PCBT	PCB, TOTAL	ug/L	2	0.26	0.26	12	1	8.3	276	42	15.2	0.05	0.06	1.72	2.31	46.0
X2124	1,2,4-TRICHLOROBENZENE	ug/L	3	0.11	0.11	12	1	8.3	276	35	12.7	0.02	0.01	2.02	2.48	40.5

PLANT NAME : Kitchener
PLANT TYPE : Secondary

SAMPLING TYPE : Raw Sewage
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
VOLATILES ORGANIC COMPOUNDS																
B2MPXY	M-, AND P-XYLENES	ug/L	1	40.00	40.00	11	1	9.1	274	43	15.7	21.30	26.00	1.23	2.02	37.6

PLANT NAME : Kitchener
PLANT TYPE : Secondary

SAMPLING TYPE : Final Effluent
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	STD. FOR SURFACE WATER	STD. REF.	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET.	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																		
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0		-	13.90	33.00	12	12	100.0	213	211	99.1	21.95	21.22	1.35	2.07	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0		-	34.00	76.00	12	12	100.0	213	211	99.1	46.41	52.80	1.34	1.83	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0		-	2.70	6.40	12	12	100.0	220	220	100.0	4.37	8.09	1.29	1.60	100.0
NNO2FR	NITRITE,FILT. REACT.	mg/L	0		-	0.03	2.78	12	12	100.0	220	194	88.2	0.66	0.22	3.42	5.95	96.4
NNOTFR	NITRATES,TOTAL FIL.T.REAC.	mg/L	0		-	9.10	18.70	12	12	100.0	224	186	83.0	13.45	2.33	1.22	7.75	96.4
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0		-	1.00	9.40	12	12	100.0	222	222	100.0	2.63	7.97	2.05	2.71	100.0
PH	(-LOG(H+(CONCN))		0		-	6.81	7.62	12	12	100.0	224	224	100.0	7.26	7.10	1.04	1.05	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0		-	3.60	6.20	12	12	100.0	220	219	99.6	4.83	10.12	1.20	2.00	100.0
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/L	0		-	0.44	1.06	13	12	92.3	211	206	97.6	0.67	0.68	1.47	1.97	100.0
NNHTPR	AMMONIUM,TOTAL FILT.REAC.	mg/L	0		-	0.50	9.30	12	9	75.0	223	204	91.5	0.66	3.90	7.23	6.98	100.0
PHNOL	PHENOLICS (4AAP)	mg/L	0	0.00	ONT-MOE	0.16	0.68	12	4	33.3	225	33	14.7	0.08	0.07	2.35	1.86	53.6
METALS																		
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	3750.00	ONT-MOE	970.00	2200.00	14	14	100.0	267	267	100.0	1230.00	340.90	1.23	2.14	100.0
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	30.00	ONT-MOE	10.00	70.00	14	14	100.0	267	262	98.1	40.00	53.30	1.71	2.48	100.0
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	75.00	ONT-MOE	60.00	3400.00	14	13	92.9	264	196	74.2	110.00	101.70	2.83	3.72	96.4
NIUT	NICKEL,UNFILT.TOTAL	ug/L	0	25.00	ONT-MOE	20.00	40.00	14	10	71.4	267	171	64.0	30.00	22.10	2.53	3.60	85.7
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	0.20	ONT-MOE	0.01	0.02	13	9	69.2	233	220	94.4	0.01	0.03	3.28	2.62	100.0
CUUT	COPPER,UNFILT.TOTAL	ug/L	0	5.00	ONT-MOE	10.00	10.00	2	1	50.0	47	30	63.8	10.00	13.10	1.63	2.56	77.8
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	100.00	ONT-MOE	10.00	30.00	14	5	35.7	267	137	51.3	10.00	9.00	1.86	2.00	89.3
CDUT	CADMIUM,UNFILT.TOTAL	ug/L	0	0.20	ONT-MOE	0.00	10.00	14	4	28.6	267	65	24.3	0.00	2.10	2.30	2.07	71.4
COUT	COBALT,UNFILT.TOTAL	ug/L	0	5.00	NYS-STD	10.00	10.00	14	3	21.4	266	65	24.4	10.00	6.40	1.62	1.54	82.1
MOUT	MOLYBDENUM,UNFILT.TOTAL	ug/L	0		-	10.00	10.00	14	3	21.4	267	75	28.1	10.00	6.60	1.34	1.56	67.9
AGUT	SILVER,UNFILT.TOTAL	ug/L	0	0.10	ONT-MOE	10.00	1250.00	14	2	14.3	267	15	5.6	10.00	6.90	4.34	1.84	32.1
CCNFUR	CYANIDE-FREE,UNFILT.REAC.	ug/L	0	5.00	ONT-MOE	10.00	10.00	12	1	8.3	222	42	18.9	0.00	1.30	2.12	3.68	46.4
PESTICIDES,HERBICIDES,PCBS																		
P324D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	4.00	ONT-MOE	0.04	1.10	12	7	58.3	227	177	78.0	0.05	0.08	5.79	4.71	100.0
P1BHCG	GAMMA-BHC(HEXCHLORCYCLHEXANE)	ug/L	2	0.06	ONT-MOE	0.01	0.05	12	4	33.3	227	157	69.2	0.01	0.02	2.52	2.48	96.4
P1DIEL	DIELDRIN	ug/L	2	0.00	ONT-MOE	0.01	0.01	12	2	16.7	227	2	0.9	0.01	0.01	1.37	1.10	3.6
P1END2	ENDOSULFAN II	ug/L	3	0.00	ONT-MOE	0.02	0.04	12	2	16.7	227	2	0.9	0.01	0.01	2.00	1.19	3.6
P1PPDE	PP-DDE	ug/L	1	0.00	ONT-MOE	0.02	0.02	12	2	16.7	227	7	3.1	0.01	0.01	1.73	1.28	17.9
P3SILV	SILVEX	ug/L	3		-	0.13	0.45	12	2	16.7	227	23	10.1	0.04	0.03	2.50	1.83	50.0
P1BHCA	ALPHA-BHC(HEXCHLORCYCLHEXANE)	ug/L	1	0.00	NYS-GUL	0.03	0.03	12	1	8.3	227	5	2.2	0.01	0.01	1.71	1.24	14.3
P1CHLA	ALPHA-CHLORDANE	ug/L	1	0.00	NYS-GUL	0.04	0.04	12	1	8.3	227	5	2.2	0.01	0.01	2.05	1.31	14.3
P1CHLG	GAMMA-CHLORDANE	ug/L	1	0.06	ONT-MOE	0.08	0.08	12	1	8.3	227	5	2.2	0.01	0.01	2.23	1.36	14.3
P1END1	ENDOSULFAN I	ug/L	3	0.00	ONT-MOE	0.02	0.02	12	1	8.3	227	1	0.4	0.01	0.01	1.54	1.12	3.6
P1ENDR	ENDRIN	ug/L	3	0.00	ONT-MOE	0.03	0.03	12	1	8.3	227	1	0.4	0.01	0.01	1.71	1.14	3.6
P1MIRX	MIREX	ug/L	1	0.00	ONT-MOE	0.01	0.01	12	1	8.3	227	1	0.4	0.01	0.01	1.31	1.08	3.6
P1PCBT	PCB, TOTAL	ug/L	2	0.00	ONT-MOE	0.19	0.19	12	1	8.3	227	9	4.0	0.03	0.02	1.94	1.40	28.6
P1PPDD	PP-DDD	ug/L	1	0.00	ONT-MOE	0.01	0.01	12	1	8.3	227	2	0.9	0.01	0.01	1.31	1.10	7.1
P345T	2,4,5-TRICLORPHENOXYACETIC ACID	ug/L	3		-	0.41	0.41	12	1	8.3	227	25	11.0	0.03	0.03	2.26	2.27	42.9
VOLATILES ORGANIC COMPOUNDS																		
X1BDCM	BROMODICHLOROMETHANE	ug/L	1	50.00	NYS-GUL	5.70	5.70	11	1	9.1	224	7	3.1	1.69	1.55	1.50	1.20	17.9

PLANT NAME : Kitchener
PLANT TYPE : Secondary

SAMPLING TYPE : Raw Sludge
SAMPLE FORM : Dry Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS (DRY WEIGHT)	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
COD	CHEMICAL OXYGEN DEMAND	mg/kg	0	1614339.62	1614339.62	1	1	100.0	45	45	100.0	1614339.62	892221.45	0.00	3.19	100.0
NH3TPR	AMMONIUM,TOTAL PILT.REAC.	mg/kg	0	10037.74	11725.07	2	2	100.0	48	47	97.9	10848.65	5911.32	1.12	6.59	100.0
NNOTPR	NITRATES,TOTAL PIL.T.REAC.	mg/kg	0	28.30	37.74	2	2	100.0	48	43	89.6	32.68	25.44	1.23	2.21	93.9
NNTKUR	NITROGEN-TOT-KJEL,UNP.TOT	mg/kg	0	52021.56	54716.98	2	2	100.0	51	51	100.0	53352.25	36897.85	1.04	2.98	100.0
PH	(-LOG(H+(CONCN))	mg/kg	0	5.50	5.78	2	2	100.0	49	49	100.0	5.64	6.03	1.04	1.10	100.0
PHENOL	PHENOLICS (4AAP)	mg/kg	0	156.33	347.17	2	2	100.0	50	41	82.0	232.97	82.34	1.76	3.56	85.3
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/kg	0	23045.82	23132.08	2	2	100.0	42	42	100.0	23088.91	20347.70	1.00	4.43	100.0
RST	RESIDUE, TOTAL	mg/kg	0	26500.00	37100.00	2	2	100.0	51	51	100.0	31355.22	32783.51	1.27	1.81	100.0
RSTLOI	RESIDUE,TOT.LOSS ON IGNI.	mg/kg	0	19200.00	25100.00	2	2	100.0	51	51	100.0	21952.68	20803.05	1.21	1.77	100.0
METALS																
AGUT	SILVER,UNFILT.TOTAL	mg/kg	0	29.81	32.35	2	2	100.0	45	40	88.9	31.05	30.17	1.06	2.61	84.4
ALUT	ALUMINUM,UNFILT.TOTAL	mg/kg	0	3773.58	4528.30	2	2	100.0	51	51	100.0	4133.76	9835.74	1.14	2.51	100.0
ASUT	ARSENIC,UNFILT.TOTAL	mg/kg	0	2.64	2.97	2	2	100.0	51	50	98.0	2.80	6.13	1.09	2.01	97.1
CDUT	CADMIUM,UNFILT.TOTAL	mg/kg	0	1.75	1.75	1	1	100.0	43	40	93.0	1.75	9.74	0.00	4.35	90.0
CRUT	CHROMIUM,UNFILT.TOTAL	mg/kg	0	258.76	415.09	2	2	100.0	51	50	98.0	327.73	301.43	1.40	3.68	97.1
CUUT	COPPER,UNFILT.TOTAL	mg/kg	0	621.13	673.85	2	2	100.0	46	46	100.0	646.96	606.31	1.06	1.72	100.0
HGUT	MERCURY,UNFILT.TOTAL	mg/kg	0	1.13	1.35	2	2	100.0	50	50	100.0	1.24	2.23	1.13	1.67	100.0
MOUT	MOLYBDENUM,UNFILT.TOTAL	mg/kg	0	6.47	6.47	1	1	100.0	37	23	62.2	6.47	5.80	0.00	2.88	64.3
NIUT	NICKEL,UNFILT.TOTAL	mg/kg	0	35.04	45.28	2	2	100.0	46	44	95.7	39.83	59.17	1.20	2.90	93.3
PBUT	LEAD,UNFILT.TOTAL	mg/kg	0	71.70	99.73	2	2	100.0	49	48	98.0	84.56	173.99	1.26	2.24	96.9
SEUT	SELENIUM,UNFILT.TOTAL	mg/kg	0	2.16	2.26	2	2	100.0	50	48	96.0	2.21	3.04	1.04	1.93	93.9
SRUT	STRONTIUM,UNFILT.TOTAL	mg/kg	0	566.04	619.95	2	2	100.0	51	51	100.0	592.38	231.70	1.07	1.97	100.0
ZNUT	ZINC,UNFILT.TOTAL	mg/kg	0	830.19	1428.57	2	2	100.0	51	51	100.0	1089.03	905.39	1.47	2.39	100.0
CCNPUR	CYANIDE-FREE,UNFILT.REAC.	mg/kg	G	0.23	0.23	2	1	50.0	40	3	7.5	0.11	0.02	2.76	2.74	10.0
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PMMCRS	M-CRESOL	ug/kg	1	64690.00	9649056.60	2	2	100.0	51	42	82.3	790061.70	116847.30	34.44	12.16	85.3
PMPHEN	PHENOL	ug/kg	2	45283.00	45283.00	2	1	50.0	51	15	29.4	13530.80	7312.80	5.52	3.00	38.2
DIOXINS AND FURANS																
P8CDD	OCTACHLORODIBENZODIOXIN	ug/kg	1	29.60	29.60	2	1	50.0	50	25	50.0	16.70	8.50	2.25	3.60	58.8
PESTICIDES,HERBICIDES,PCBS																
P1CHLG	GAMMA-CHLORDANE	ug/kg	1	11.30	13.50	2	2	100.0	51	19	37.3	12.40	6.00	1.13	2.44	50.0
P1DIEL	DIELDRIN	ug/kg	2	5.40	64.20	2	2	100.0	51	20	39.2	18.60	7.20	5.76	3.10	50.0
P1END1	ENDOSULFAN I	ug/kg	3	16.20	18.90	2	2	100.0	51	9	17.7	17.50	4.60	1.12	2.56	20.6
P1PCBT	PCB, TOTAL	ug/kg	2	48.50	117.00	2	2	100.0	51	40	78.4	75.30	88.70	1.86	3.18	79.4
P1PPDR	PP-DDD	ug/kg	1	10.80	30.20	2	2	100.0	51	22	43.1	18.10	7.30	2.07	2.31	52.9
P245T	2,4,5-TRICLORPHENOXYACETIC ACID	ug/kg	3	32.30	313.60	2	2	100.0	51	21	41.2	100.60	48.90	4.99	3.49	47.1
P5SILV	SILVEX	ug/kg	3	86.30	110.90	2	2	100.0	51	23	45.1	97.80	47.30	1.19	3.40	55.9
P1BHCA	ALPHA-BHC(HEXACHLORCYCLOHEXANE)	ug/kg	1	18.90	18.90	2	1	50.0	51	12	23.5	8.50	5.50	3.11	2.74	35.3
P1BHCG	GAMMA-BHC(HEXACHLORCYCLOHEXANE)	ug/kg	2	30.20	30.20	2	1	50.0	51	28	54.9	9.00	8.90	5.51	2.69	67.7
P1CHLA	ALPHA-CHLORDANE	ug/kg	1	11.30	11.30	2	1	50.0	51	18	35.3	5.50	5.90	2.75	2.38	47.1

PLANT NAME : Kitchener
PLANT TYPE : Secondary

SAMPLING TYPE : Raw Sludge
SAMPLE FORM : Dry Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS (DRY WEIGHT)	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
P1ENDR	ENDRIN	ug/kg	3	26.40	26.40	2	1	50.0	51	8	15.7	8.40	4.20	5.01	2.21	23.5
P1HEPE	HEPTACHLOREPOXIDE	ug/kg	2	37.70	37.70	2	1	50.0	51	12	23.5	10.10	5.00	6.45	2.62	32.4
P1HEPT	HEPTACHLOR	ug/kg	3	30.20	30.20	2	1	50.0	51	7	13.7	9.00	4.50	5.51	2.83	20.6
P1OCHL	OXYCHLORDANE	ug/kg	2	11.30	11.30	2	1	50.0	51	8	15.7	5.50	4.50	2.75	2.27	20.6
P1PPDD	PP-DDD	ug/kg	1	29.60	29.60	2	1	50.0	51	13	25.5	10.60	5.10	4.27	2.48	35.3
P1PPDT	PP-DDT	ug/kg	3	48.50	48.50	2	1	50.0	51	6	11.8	27.10	16.40	2.28	2.27	17.7
P324D	2,4-DICHLOROPHENOXYACETIC ACID	ug/kg	3	3246.40	3246.40	2	1	50.0	51	38	74.5	132.40	93.20	92.27	6.50	82.3
X2124	1,2,4-TRICHLOROBENZENE	ug/kg	3	34.00	34.00	2	1	50.0	51	17	33.3	9.60	9.30	6.05	4.06	41.2

PLANT NAME : Kitchener
PLANT TYPE : Secondary

SAMPLING TYPE : Treated Sludge
SAMPLE FORM : Dry Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS (DRY WEIGHT)	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
COD	CHEMICAL OXYGEN DEMAND	mg/kg	0	74261.36	1145344.13	2	2	100.0	36	36	100.0	291641.59	508097.94	6.92	4.65	100.0
NNHTPR	AMMONIUM,TOTAL FIL.T.REAC.	mg/kg	0	29281.36	41295.55	2	2	100.0	25	25	100.0	34761.53	17658.28	1.28	2.92	100.0
NNTKUR	NITROGEN-TOT-KJEL.,UNP.TOT	mg/kg	0	59090.91	72874.49	2	2	100.0	49	49	100.0	65621.80	38494.12	1.16	1.77	100.0
PH	(-LOG(H+(CONCN))	mg/kg	0	7.59	7.75	2	2	100.0	47	47	100.0	7.67	7.17	1.01	1.09	100.0
PHNOL	PHENOLICS (4AAP)	mg/kg	0	90.91	526.32	2	2	100.0	49	41	83.7	218.74	43.05	3.46	3.14	87.9
PPUT	PHOSPHORUS,UNFIL.T.TOTAL	mg/kg	0	27982.95	38663.97	2	2	100.0	43	43	100.0	32892.74	76638.67	1.26	6.91	100.0
RST	RESIDUE, TOTAL	mg/kg	0	26700.00	35200.00	2	2	100.0	50	50	100.0	29486.27	80434.04	1.28	3.23	100.0
RSTLOI	RESIDUE,TOT.LOSS ON IGNI	mg/kg	0	14100.00	17400.00	2	2	100.0	50	50	100.0	15663.33	43379.33	1.16	3.19	100.0
NNOTPR	NITRATES,TOTAL FIL.T.REAC.	mg/kg	0	78.95	78.95	2	1	50.0	26	23	88.5	74.88	42.68	1.08	2.29	95.0
METALS																
AGUT	SILVER,UNFIL.T.TOTAL.	mg/kg	0	39.77	44.53	2	2	100.0	44	44	100.0	42.09	37.78	1.08	2.33	100.0
ALUT	ALUMINUM,UNFIL.T.TOTAL.	mg/kg	0	5681.82	7287.45	2	2	100.0	50	50	100.0	6434.75	10715.94	1.19	2.82	100.0
ASUT	ARSENIC,UNFIL.T.TOTAL.	mg/kg	0	3.69	5.26	2	2	100.0	50	49	98.0	4.41	5.40	1.28	2.06	97.1
CDUT	CADMIUM,UNFIL.T.TOTAL.	mg/kg	0	1.73	1.73	1	1	100.0	45	41	91.1	1.73	10.47	0.00	3.98	90.3
CRUT	CHROMIUM,UNFIL.T.TOTAL.	mg/kg	0	511.36	566.80	2	2	100.0	50	50	100.0	538.37	333.06	1.08	3.59	100.0
CUUT	COPPER,UNFIL.T.TOTAL.	mg/kg	0	909.09	963.97	2	2	100.0	45	45	100.0	936.13	732.24	1.04	2.16	100.0
HGUT	MERCURY,UNFIL.T.TOTAL.	mg/kg	0	2.27	2.43	2	2	100.0	50	49	98.0	2.35	3.24	1.05	2.04	97.1
MOUT	MOLYBDENUM,UNFIL.T.TOTAL.	mg/kg	0	5.11	5.11	1	1	100.0	34	23	67.7	5.11	6.41	0.00	2.84	69.2
NIUT	NICKEL,UNFIL.T.TOTAL.	mg/kg	0	65.34	68.83	2	2	100.0	45	42	93.3	67.06	72.95	1.04	2.95	90.0
PBUT	LEAD,UNFIL.T.TOTAL.	mg/kg	0	136.36	149.80	2	2	100.0	50	49	98.0	142.92	196.62	1.07	2.46	97.1
SEUT	SELENIUM,UNFIL.T.TOTAL.	mg/kg	0	3.69	4.45	2	2	100.0	50	48	96.0	4.06	2.67	1.14	2.98	97.1
SRUT	STRONTIUM,UNFIL.T.TOTAL.	mg/kg	0	767.05	809.72	2	2	100.0	50	50	100.0	788.09	260.93	1.04	2.54	100.0
ZNUT	ZINC,UNFIL.T.TOTAL.	mg/kg	0	1214.57	1562.50	2	2	100.0	50	50	100.0	1377.60	988.90	1.20	2.57	100.0
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PMOCRE	M-CRESOL	ug/kg	1	40352.20	40352.20	2	1	50.0	50	15	30.0	13113.20	5281.80	4.90	8.20	35.3
PMPHEN	PHENOL	ug/kg	2	15558.70	15558.70	2	1	50.0	50	3	6.0	8142.60	2108.80	2.50	3.65	8.8
DIOXINS AND FURANS																
P96CDD	OCTACHLORODIBENZODIOXIN	ug/kg	1	89.10	89.10	2	1	50.0	49	26	53.1	11.20	7.10	10.86	3.84	64.7
PESTICIDES,HERBICIDES,PCBS																
P1CHLA	ALPHA-CHLORDANE	ug/kg	1	12.10	25.60	2	2	100.0	50	22	44.0	17.60	6.50	1.70	2.41	55.9
P1CHLG	GAMMA-CHLORDANE	ug/kg	1	12.10	19.90	2	2	100.0	50	21	42.0	15.50	6.80	1.42	2.58	52.9
P1DMOT	METHOXYCHLOR	ug/kg	1	40.50	113.60	2	2	100.0	50	15	30.0	67.80	34.10	2.07	4.42	38.2
P1ENDI	ENDOSULFAN I	ug/kg	3	12.10	113.60	2	2	100.0	50	6	12.0	37.10	4.90	4.87	2.96	11.8
P1PCBT	PCB, TOTAL	ug/kg	2	34.10	406.90	2	2	100.0	50	32	64.0	117.50	114.10	5.75	4.58	67.7
P1PPDE	PP-DDE	ug/kg	1	56.70	164.80	2	2	100.0	50	34	68.0	96.70	11.10	2.13	2.72	73.5
P5SILV	SILVEX	ug/kg	5	90.90	969.10	2	2	100.0	50	18	36.0	299.80	92.70	5.41	2.94	44.1
P1BHCA	ALPHA-BHC(HEXCHLORCYCLOHEXANE)	ug/kg	1	54.00	54.00	2	1	50.0	50	11	22.0	14.70	5.60	6.30	3.03	32.4
P1BHCB	BETA-BHC (HEXCHLORCYCLOHEXANE)	ug/kg	1	25.60	25.60	2	1	50.0	50	19	38.0	10.10	8.80	3.72	4.39	47.1
P1BHCG	GAMMA-BHC(HEXCHLORCYCLOHEXANE)	ug/kg	2	16.20	16.20	2	1	50.0	50	12	24.0	6.70	5.70	3.46	3.13	35.3
P1DIEL	DIELDRIN	ug/kg	2	20.20	20.20	2	1	50.0	50	15	30.0	7.50	6.50	4.04	3.51	38.2

PLANT NAME : Kitchener
PLANT TYPE : Secondary

SAMPLING TYPE : Treated Sludge
SAMPLE FORM : Dry Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS (DRY WEIGHT)	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
P1END2	ENDOSULFAN II	ug/kg	3	17.00	17.00	2	1	50.0	50	7	14.0	8.20	4.70	2.78	2.67	20.6
P1ENDR	ENDRIN	ug/kg	3	56.80	56.80	2	1	50.0	50	5	10.0	15.10	4.20	6.53	2.36	14.7
P1HEPT	HEPTACHLOR	ug/kg	3	16.20	16.20	2	1	50.0	50	9	18.0	6.70	4.70	3.46	2.20	23.5
P1MIRX	MIREX	ug/kg	1	28.30	28.30	2	1	50.0	50	8	16.0	8.90	4.90	5.13	2.52	17.7
P1OCHL	OXYCHLORDANE	ug/kg	2	8.10	8.10	2	1	50.0	50	6	12.0	4.80	4.20	2.12	2.24	17.7
P1PPDD	PP-DDD	ug/kg	1	68.20	68.20	2	1	50.0	50	7	14.0	16.50	4.60	7.43	2.47	20.6
P1PPDT	PP-DDT	ug/kg	3	181.80	181.80	2	1	50.0	50	5	10.0	54.30	16.70	5.53	2.14	14.7
P245T	2,4,5-TRICLORPHENOXYACETIC ACID	ug/kg	3	1443.30	1443.30	2	1	50.0	50	16	32.0	143.20	84.40	26.26	3.13	41.2
P24D	2,4-DICHLOROPHENOXYACETIC ACID	ug/kg	3	2792.70	2792.70	2	1	50.0	50	25	50.0	126.20	75.00	79.84	5.81	64.7
X2124	1,2,4-TRICHLOROBENZENE	ug/kg	3	56.70	56.70	2	1	50.0	50	22	44.0	12.60	14.80	8.39	5.02	52.9
X2HCB	HEXACHLOROBENZENE	ug/kg	2	12.10	12.10	2	1	50.0	50	21	42.0	5.80	7.00	2.81	2.96	55.9

Sub-Appendix A-11

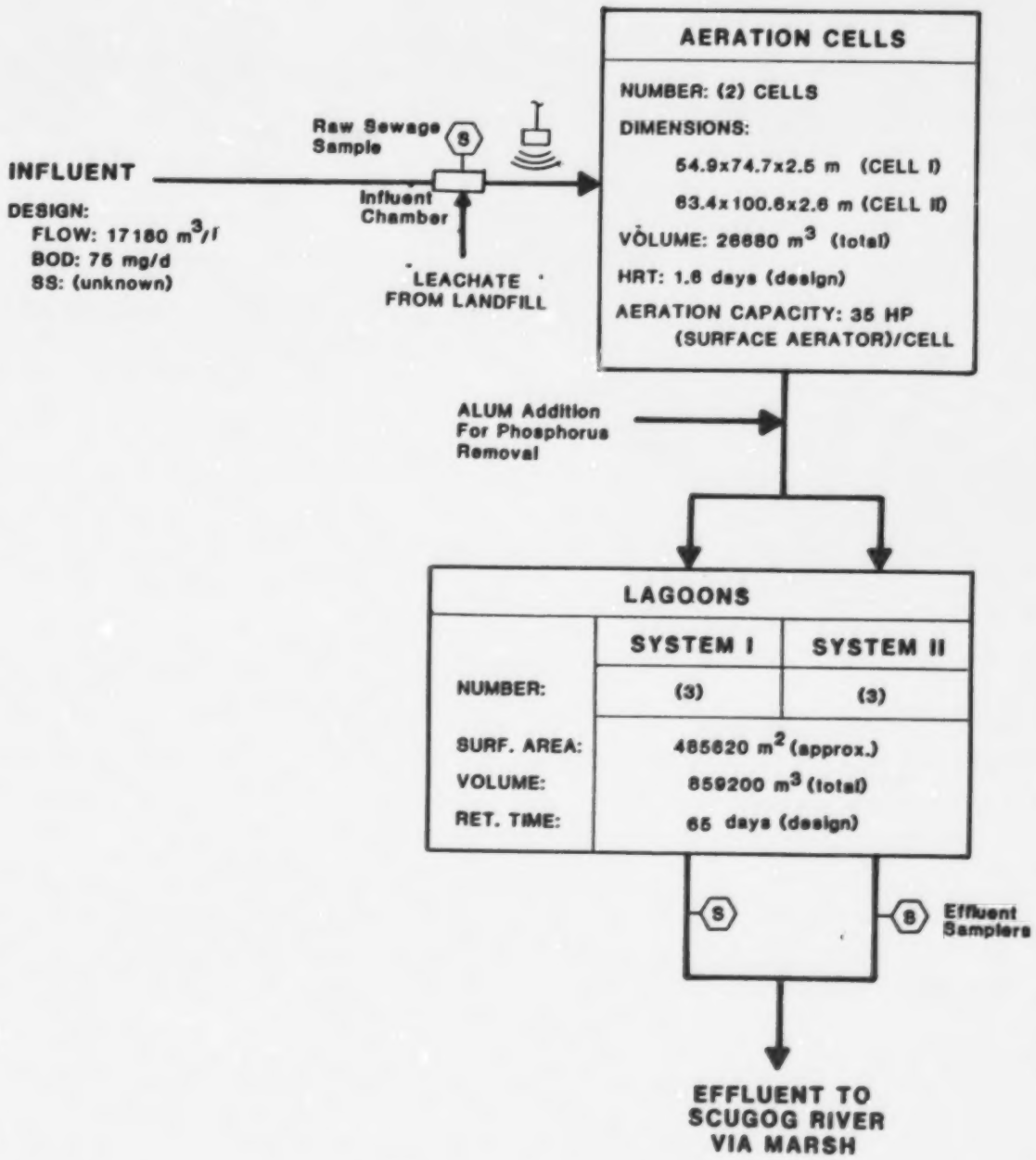
Lindsay Lagoon

Contents:

- Plant Schematic with Design Characteristics
- Annual Data Review (1981 - 1986 Plant Performance)
- Sources of Municipal Water Pollution Control Plant Raw Sewage
- Operational Evaluation for Lindsay Lagoon
- Analytical Data

(KIR18/28A)

LINDSAY LAGOONS



CANVIRO

LINDSAY LAGOON
Conventional Lagoon Continuous
Aerated Cell
Phosphorus Resoval - Continuous
11.365 10(3)m3/day

PARAMETER	1981	1982	1983	1984	1985	5 YEAR AVERAGE 1981 - 85
Avg. Daily Flow (1000 m3/day)	10.60	10.46	8.96	12.91	10.33	11.03
BOD5 - Influent (mg/L)	90.30	99.20	94.60	100.17	91.89	95.41
BOD5 - Effluent (mg/L)	9.50	12.20	9.30	20.00	1.00	10.74
Annual BOD5 Significantly Different from Mean						
Annual Average BOD5?	I.D.	I.D.	I.D.	I.D.	I.D.	
TSS - Influent (mg/L)	107.90	90.90	97.00	107.70	210.33	110.33
TSS - Effluent (mg/L)	19.50	9.30	11.90	23.43	5.96	14.44
Annual TSS Significantly Different from Mean						
Annual Average TSS?	I.D.	I.D.	I.D.	I.D.	I.D.	
Total P - Influent (mg/L)	4.40	3.99	4.70	4.16	3.03	4.24
Total P - Effluent (mg/L)	0.56	0.04	0.31	0.07	0.52	0.50
Annual TP Significantly Different from Mean						
Annual Average TP?	I.D.	I.D.	I.D.	I.D.	I.D.	
TP in Compliance?	Y	Y	Y	Y	Y	Y

I.D. - Insufficient Data

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SOURCES OF MUNICIPAL SEWAGE TREATMENT PLANT RAW SEWAGE

GENERAL DESCRIPTION OF SEWAGE TREATMENT PLANT (STP)

NAME OF STP	LINDSAY WPCP
WORKS NUMBER	110000383
TREATMENT TYPE	CONVENTIONAL LAGOON CONTINUOUS AERATED CELL PHOSPHOSRUS CONTINUOUS
DESIGN CAPACITY	17.184
AVERAGE DAY FLOW (1986)	13.225
POPULATION SERVED	14636

% OF TOTAL FLOW ATTRIBUTED TO

INDUSTRIAL SOURCES	19
COMMERCIAL SOURCES (Populationx 0.0757)	8
RESIDENTIAL SOURCES (Population x 0.175)	19
UNACCOUNTED FOR, INCL. INFILTRATION (100-% Contributed from industrial, commercial and residential sources)	53

PROFILE OF INDUSTRIES IN CATCHMENT

TOTAL NO OF INDUSTRIES	62
SOURCES OF MUNICIPAL WATER POLLUTIO	32
NO OF SIC CATAGORIES	28

GENERAL DESCRIPTION OF WATER POLLUTION CONTROL PLANT (WPCP)

NAME OF WPCP WORKS NUMBER TREATMENT TYPE	SIC	# OF COMPANIES
ASBESTOS MFG	3292-3292	1
DESIGN CAPACITY (1000 m3/d)	3353-3355	1
1986 AVERAGE DAY FLOW (1000 m3/d)	2821-2824	1
POPULATION SERVED	3070-3079	5
MISC FABRICATED METAL PROD.	3490-3499	1

% OF TOTAL FLOW ATTRIBUTED TO:

INDUSTRIAL SOURCES (%)

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OPERATIONAL EVALUATION FOR: L I N D S A Y L A G O O N

TREATMENT FACILITY: Other (Lagoon)
PERIOD ENDING: April 24, 1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 17,180 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
RAW SEWAGE FLOW	29,127	28,890	26,654	24,863	23,167	22,735	17,607
% of Design Flow	169.54%	168.16%	155.15%	144.72%	134.85%	132.33%	102.49%
Influent BOD (mg/L)	29.7	35.1		61.3			
Primary BOD (mg/L)							
Secondary BOD (mg/L)	17.6	14.5		14.7			
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	40.7%	58.7%		76.0%			
Influent SS (mg/L)	48.6	43.9		45.4			
Primary SS (mg/L)							
Secondary SS (mg/L)	25.0	20.6		13.3			
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	48.6%	53.1%		70.7%			
Influent NH4 (mg/L)	7.9	8.4		10.9			
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)	9.3	8.3		8.9			
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	-17.7%	1.2%		18.3%			
Influent TKN (mg/L)	12.5	13.0		14.5			
Primary TKN (mg/L)							
Secondary TKN (mg/L)	12.2	11.8		10.7			
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	2.4%	9.2%		26.2%			
Influent Total P (mg/L)	4.10	4.30		3.10			
Primary Total P (mg/L)							
Secondary Total P (mg/L)	0.60	0.50		0.30			
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	85.4%	88.4%		90.3%			

OPERATIONAL EVALUATION FOR: L I N D S A Y L A G O O N

TREATMENT FACILITY: Other (Lagoon)
PERIOD ENDING: April 24, 1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 17,180 m3/d

PARAMETER	PRE-SAMPLING PERIOD DAY 8	DAY 9	DAY 10	DAY 11	DAY 12	DAY 13	DAY 14
RAW SEWAGE FLOW	16,343	17,707	17,371	18,753	16,652	15,470	13,797
% of Design Flow	95.13%	103.07%	101.11%	109.16%	96.93%	90.05%	80.31%
Influent BOD (mg/L)	64.1						
Primary BOD (mg/L)							
Secondary BOD (mg/L)	6.9						
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	89.2%						
Influent SS (mg/L)	58.8						
Primary SS (mg/L)							
Secondary SS (mg/L)	12.9						
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	78.1%						
Influent NH4 (mg/L)	10.9						
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)	8.1						
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	25.7%						
Influent TKN (mg/L)	17.3						
Primary TKN (mg/L)							
Secondary TKN (mg/L)	10.4						
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	39.9%						
Influent Total P (mg/L)	6.50						
Primary Total P (mg/L)							
Secondary Total P (mg/L)	0.30						
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	95.4%						

OPERATIONAL EVALUATION FOR: L I N D S A Y L A G O O N

TREATMENT FACILITY: Other (Lagoon)
PERIOD ENDING: April 24, 1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 17,180 m3/d

PARAMETER	SAMPLING PERIOD DAY 15	DAY 16	DAY 17	DAY 18	DAY 19	DAY 20	DAY 21
RAW SEWAGE FLOW	13,324	16,679	15,556	14,652	15,020		
% of Design Flow	77.56%	97.08%	90.55%	85.29%	87.43%		
Influent BOD (mg/L)							
Primary BOD (mg/L)							
Secondary BOD (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent SS (mg/L)							
Primary SS (mg/L)							
Secondary SS (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)							
Primary Total P (mg/L)							
Secondary Total P (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							

PLANT NAME : Lindsay
PLANT TYPE : Lagoon

SAMPLING TYPE : Raw Sewage
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0	27.30	120.00	5	5	100.0	267	266	99.6	72.85	140.23	1.82	1.93	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0	98.00	202.00	5	5	100.0	260	258	99.2	151.44	287.75	1.32	1.82	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0	14.40	16.70	5	5	100.0	271	271	100.0	15.58	22.39	1.06	1.81	100.0
NNHTPR	AMMONIUM,TOTAL FILT.REAC.	mg/L	0	6.90	11.70	5	5	100.0	275	274	99.6	10.17	15.37	1.26	1.69	100.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0	10.70	19.30	5	5	100.0	273	273	100.0	16.59	25.44	1.28	1.47	100.0
PH	(-LOG(H+(CONCN))		0	7.24	7.57	5	5	100.0	275	275	100.0	7.40	6.90	1.02	1.05	100.0
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/L	0	5.03	10.50	6	6	100.0	248	248	100.0	6.57	5.18	1.29	1.51	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0	38.10	96.00	5	5	100.0	267	266	99.6	68.25	126.88	1.43	1.93	100.0
METALS																
CUUT	COPPER,UNFILT.TOTAL	ug/L	0	50.00	50.00	1	1	100.0	49	48	98.0	50.00	110.60	0.00	2.28	97.1
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	0.05	0.13	5	5	100.0	283	274	96.8	0.09	0.23	1.42	2.11	100.0
MOUT	MOLYBDENUM,UNFILT.TOTAL	ug/L	0	20.00	590.00	5	5	100.0	321	41	12.8	100.00	12.40	3.59	1.72	56.8
PBUT	LEAD,UNFILT.TOTAL	ug/L	0	70.00	570.00	6	6	100.0	322	57	17.7	230.00	59.50	2.14	1.86	51.4
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	80.00	330.00	5	5	100.0	319	318	99.7	220.00	370.70	1.78	2.14	100.0
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	60.00	280.00	6	6	100.0	322	315	97.8	150.00	211.00	1.66	2.94	100.0
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	260.00	1450.00	6	5	83.3	322	306	95.0	520.00	1000.10	2.80	2.65	97.3
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	10.00	60.00	6	5	83.3	322	237	73.6	30.00	51.10	2.37	3.44	89.2
CCNFUR	CYANIDE-FREE,UNFILT.REAC.	ug/L	0	10.00	10.00	5	2	40.0	271	82	30.3	0.00	1.90	4.53	6.88	32.4
COUT	COBALT,UNFILT.TOTAL	ug/L	0	20.00	70.00	6	2	33.3	322	82	25.5	10.00	9.30	2.90	2.31	83.8
AGUT	SILVER,UNFILT.TOTAL	ug/L	0	20.00	20.00	6	1	16.7	321	82	25.6	10.00	10.40	2.17	2.55	75.7
CDUT	CADMIUM,UNFILT.TOTAL	ug/L	0	20.00	20.00	6	1	16.7	322	76	23.6	0.00	6.50	2.80	2.09	70.3
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PMPHEN	PHENOL	ug/L	2	19.50	170.50	5	5	100.0	275	118	42.9	59.48	14.52	2.80	2.46	78.4
PESTICIDES,HERBICIDES,PCBS																
P324D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	0.19	0.40	5	5	100.0	276	214	77.5	0.25	0.13	1.35	3.72	100.0
P1DMDT	METHOXYCHLOR	ug/L	1	0.20	1.60	5	4	80.0	276	47	17.0	0.34	0.08	4.35	3.14	43.2
P1BHCG	GAMMA-BHC(HEXCHLORCYCLHEXANE)	ug/L	2	0.03	0.03	5	2	40.0	276	143	51.8	0.02	0.02	1.83	2.29	94.6
P1BHCB	BETA-BHC (HEXCHLORCYCLHEXANE)	ug/L	1	0.02	0.02	5	1	20.0	276	32	11.6	0.01	0.01	1.36	1.66	35.1
X2HCB	HEXACHLOROBENZENE	ug/L	2	0.08	0.08	5	1	20.0	276	11	4.0	0.02	0.01	2.53	1.39	18.9

PLANT NAME : Lindsay
PLANT TYPE : Lagoon

SAMPLING TYPE : Final Effluent
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	STD. FOR SURFACE WATER	STD. REF.	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET.	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																		
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0		-	14.40	19.70	5	5	100.0	10	10	100.0	16.58	25.95	1.14	1.66	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0		-	44.00	56.00	5	5	100.0	10	10	100.0	49.74	70.64	1.12	1.47	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0		-	8.30	10.20	5	5	100.0	10	10	100.0	9.03	10.09	1.09	1.14	100.0
NNHTFR	AMMONIUM,TOTAL FILT.REAC.	mg/L	0		-	4.75	6.35	5	5	100.0	10	6	60.0	5.60	0.60	1.13	12.80	100.0
NNO2FR	NITRITE,FILT. REACT.	mg/L	0		-	0.11	0.17	5	5	100.0	10	10	100.0	0.13	0.42	1.23	4.77	100.0
NNOTFR	NITRATES,TOTAL FILT.REAC.	mg/L	0		-	0.40	0.70	5	5	100.0	10	10	100.0	0.55	1.65	1.27	3.25	100.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0		-	8.30	10.00	5	5	100.0	10	10	100.0	9.15	10.85	1.09	1.64	100.0
PH	(-LOG(H+(CONCN))		0		-	7.74	8.38	5	5	100.0	10	10	100.0	7.99	7.92	1.03	1.03	100.0
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/L	0		-	0.20	0.31	6	6	100.0	6	6	100.0	0.26	0.26	1.18	1.18	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0		-	17.30	26.30	5	5	100.0	10	10	100.0	20.62	29.12	1.18	1.50	100.0
METALS																		
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	75.00	ONT-MOE	190.00	240.00	6	6	100.0	12	12	100.0	210.00	171.20	1.09	1.31	100.0
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	0.20	ONT-MOE	0.01	0.02	5	5	100.0	10	10	100.0	0.01	0.01	1.36	1.25	100.0
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	3750.00	ONT-MOE	160.00	200.00	6	6	100.0	12	12	100.0	170.00	230.70	1.09	1.36	100.0
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	30.00	ONT-MOE	10.00	20.00	6	5	83.3	12	11	91.7	10.00	11.90	1.43	1.37	100.0
CDUT	CADMIUM,UNFILT.TOTAL	ug/L	0	0.20	ONT-MOE	0.00	0.00	6	2	33.3	12	3	25.0	0.00	1.80	1.68	1.49	100.0
NIUT	NICKEL,UNFILT.TOTAL	ug/L	0	25.00	ONT-MOE	10.00	10.00	6	2	33.3	12	3	25.0	10.00	6.90	1.46	1.74	100.0
COUT	COBALT,UNFILT.TOTAL	ug/L	0	5.00	NYS-STD	10.00	10.00	6	1	16.7	12	3	25.0	10.00	6.30	1.43	1.41	100.0
MOUT	MOLYBDENUM,UNFILT.TOTAL	ug/L	0		-	10.00	10.00	6	1	16.7	12	3	25.0	10.00	5.90	1.33	1.37	100.0
PESTICIDES,HERBICIDES,PCBS																		
P324D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	4.00	ONT-MOE	0.03	0.04	5	5	100.0	10	7	70.0	0.03	0.03	1.14	2.08	100.0
P1DMDT	METHOXYCHLOR	ug/L	1	0.04	ONT-MOE	0.10	0.70	5	4	80.0	10	4	40.0	0.17	0.07	3.65	3.77	50.0
X2124	1,2,4-TRICHLOROBENZENE	ug/L	3	0.50	ONT-MOE	0.02	0.04	5	2	40.0	10	2	20.0	0.01	0.01	2.67	2.11	50.0
P1BHCG	GAMMA-BHC(HEXACHLORCYCLOHEXANE)	ug/L	2	0.06	ONT-MOE	0.01	0.01	5	1	20.0	10	1	10.0	0.01	0.01	1.36	1.25	50.0
P1HEPT	HEPTACHLOR	ug/L	3	0.00	ONT-MOE	0.01	0.01	5	1	20.0	10	1	10.0	0.01	0.01	1.36	1.25	50.0
X1HCCP	HEXACHLOROCYCLOPENTADIENE	ug/L	3	0.07	NYS-STD	0.13	0.13	5	1	20.0	10	1	10.0	0.06	0.06	1.53	1.35	50.0

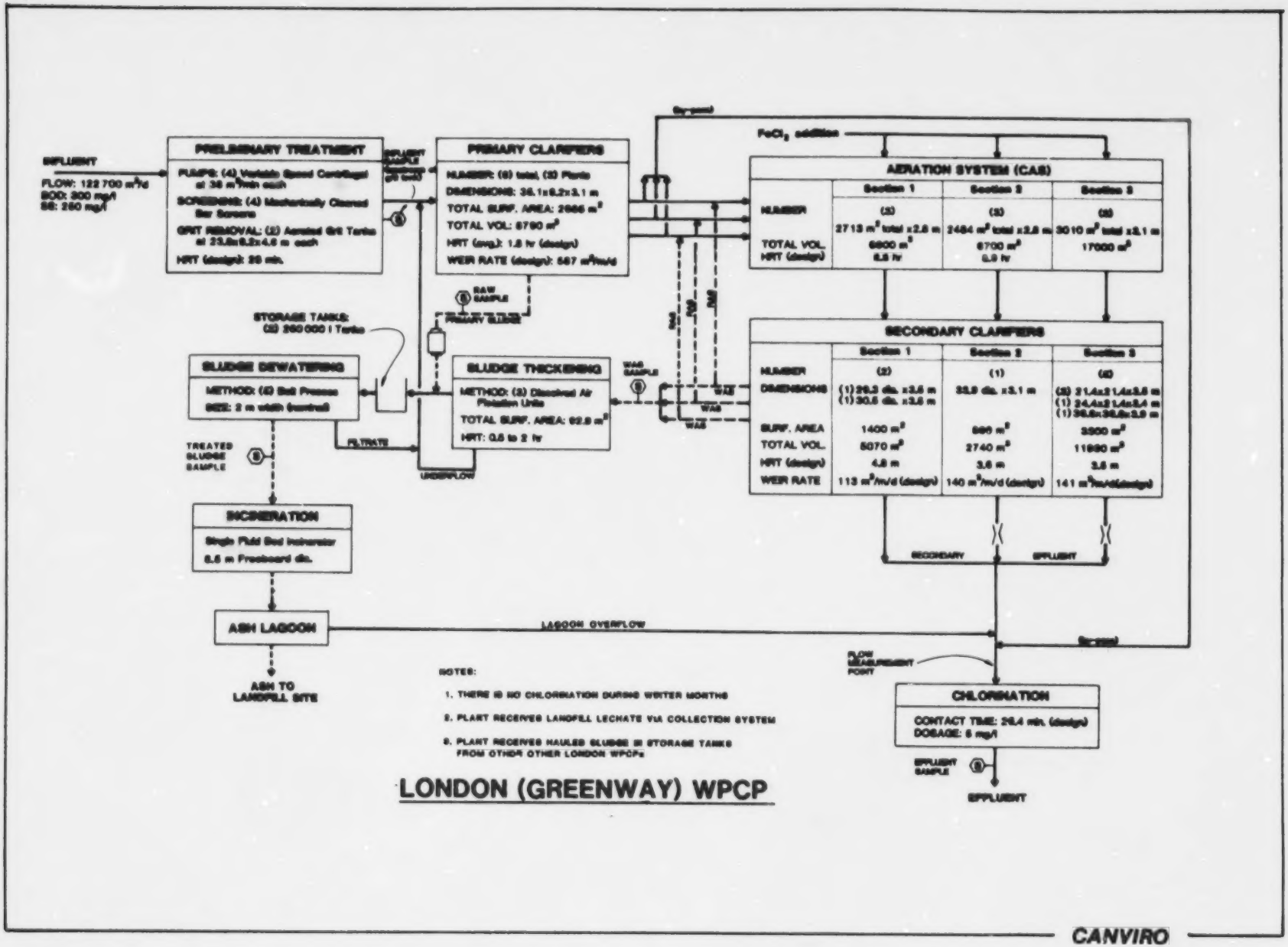
Sub-Appendix A-12

London (Greenway) WPCP

Contents:

- Plant Schematic with Design Characteristics
- Annual Data Review (1981 - 1986 Plant Performance)
- Sources of Municipal Water Pollution Control Plant Raw Sewage
- Operational Evaluation for London (Greenway) WPCP
- Analytical Data

(KIR18/28A)



LONDON (GREENWAY) WPCP

CANVIRO

GREENWAY WPCP
Conventional Activated Sludge
Phosphorus Reaoval - Continuous
Capacity - 123.333 10(3)m3/day

PARAMETER	1981	1982	1983	1984	1985	MEAN ANNUAL AVERAGE
Avg. Daily Flow (1000 m3/day)	103.65	123.70	122.37	127.70	131.97	121.87
BOD5 - Influent (mg/L)	170.20	151.10	153.00	156.00	190.92	164.26
BOD5 - Effluent (mg/L)	4.10	4.00	3.50	4.92	5.17	4.34
Annual BOD5 Significantly Different from Mean Annual Average BOD5?	I.D.	I.D.	I.D.	I.D.	I.D.	
TSS - Influent (mg/L)	204.00	112.70	155.00	179.42	157.00	161.70
TSS - Effluent (mg/L)	7.40	7.30	6.90	9.33	9.50	8.10
Annual TSS Significantly Different from Mean Annual Average TSS?	I.D.	I.D.	I.D.	I.D.	I.D.	
Total P - Influent (mg/L)	6.60	6.16	5.50	6.44	5.61	6.06
Total P - Effluent (mg/L)	1.03	1.19	0.99	0.93	0.77	0.98
Annual TP Significantly Different from Mean Annual Average TP?	I.D.	I.D.	I.D.	I.D.	I.D.	
TP in Compliance?	N	N	Y	Y	Y	Y

I.D. - Insufficient Data

R

SOURCES OF MUNICIPAL WATER POLLUTION CONTROL PLANT RAW SEWAGE

GENERAL DESCRIPTION OF WATER POLLUTION CONTROL PLANT (WPCP)

NAME OF WPCP	GREENWAY WPCP
WORKS NUMBER	120000863
TREATMENT TYPE	CONVENTIONAL ACTIVATED SLUDGE PHOSPHORUS REMOVAL CONTINUOUS
DESIGN CAPACITY (1000 m3/d)	124.330
1986 AVERAGE DAY FLOW (1000 m3/d)	123.733
POPULATION SERVED	164614

% OF TOTAL FLOW ATTRIBUTED TO:

INDUSTRIAL SOURCES (%)	8
COMMERCIAL SOURCES (%) (Population x 0.0757)	10
RESIDENTIAL SOURCES (%) (Population x 0.175)	23
UNACCOUNTED FOR, INCL. INFILTRATION (100-% Contributed from industrial, commercial and residential sources)	59

PROFILE OF INDUSTRIES IN CATCHMENT

TOTAL NO OF INDUSTRIES	425
INDUSTRIES WITH WATER	115
NO OF SIC CATEGORIES	47

DESCRIPTION OF THE TOP 5 INDUSTRIES DISCHARGED TO THE WPCP (BASED ON WATER USE DATA)

DESCRIPTION	SIC	# OF COMPANIES
BEVERAGES	2082-2087	1
DAIRY	2021-2026	2
FRUIT/VEGETABLES	2032-2038	3
APPAREL AND OTHER TEXTILES	2311-2399	15
ELECTROPLATING	3471-3471	4

OPERATIONAL EVALUATION FOR: LONDON GREENWAY WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: February 20, 1987
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: 122,700 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
RAW SEWAGE FLOW	116,698	107,151	103,333	104,924	107,333	98,696	100,741
% of Design Flow	95.11%	87.33%	84.22%	85.51%	87.48%	80.44%	82.10%
Influent BOD (mg/L)		185.0	287.0	251.0			
Primary BOD (mg/L)		135.0	192.0	159.0			
Secondary BOD (mg/L)		7.0	6.0	7.0			
% PRIMARY REMOVAL		27.0%	33.1%	36.7%			
% SECONDARY REMOVAL		96.2%	97.9%	97.2%			
Influent SS (mg/L)	215.0	158.0	161.0	160.0	108.0	67.0	104.0
Primary SS (mg/L)	89.0	32.0	70.0	88.0			107.0
Secondary SS (mg/L)	14.0	8.0	23.0	24.0	8.0	9.0	7.0
% PRIMARY REMOVAL	58.6%	79.7%	56.5%	45.0%			-2.9%
% SECONDARY REMOVAL	93.5%	94.9%	85.7%	85.0%	92.6%	86.6%	93.3%
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)	9.20	6.70	6.30	6.40			
Primary Total P (mg/L)							
Secondary Total P (mg/L)	1.40	0.80	0.90	1.40			
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	84.8%	88.1%	85.7%	78.1%			

NOTE : Values for BOD, SS, Total P are taken from Section One.
(Greenway is sub-divided into three sections - see schematic)

OPERATIONAL EVALUATION FOR: LONDON GREENWAY WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: February 20, 1987
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: 122,700 m3/d

PARAMETER	PRE-SAMPLING PERIOD						
	DAY 8	DAY 9	DAY 10	DAY 11	DAY 12	DAY 13	DAY 14
RAW SEWAGE FLOW	108,970	109,924	102,924	103,515	101,287	85,967	87,148
% of Design Flow	88.8%	89.5%	83.8%	84.3%	82.5%	70.0%	71.0%
Influent BOD (mg/L)	237.0	148.0	301.0	151.0	146.0	133.0	188.0
Primary BOD (mg/L)	61.0	75.0	87.0	76.0			57.0
Secondary BOD (mg/L)	15.0	13.0	11.0	10.0	17.0	6.0	11.0
% PRIMARY REMOVAL	74.3%	49.3%	71.1%	49.7%			69.7%
% SECONDARY REMOVAL	93.7%	91.2%	96.3%	93.4%	88.4%	95.5%	94.1%
Influent SS (mg/L)							
Primary SS (mg/L)							
Secondary SS (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)	7.90	8.10	6.20	4.70			7.10
Primary Total P (mg/L)							
Secondary Total P (mg/L)	1.00	1.20	0.06	0.30			0.50
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	87.3%	85.2%	99.0%	93.6%			93.0%

NOTE : Values for BOD, SS, Total P are taken from Section One.
(Greenway is sub-divided into three sections - see schematic)

OPERATIONAL EVALUATION FOR: LONDON GREENWAY WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: February 20, 1987
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: 122,700 m3/d

PARAMETER	SAMPLING PERIOD						
	DAY 15	DAY 16	DAY 17	DAY 18	DAY 19	DAY 20	DAY 21
RAW SEWAGE FLOW	97,332	98,196	99,696	101,287	100,560		
% of Design Flow	79.33%	80.03%	81.25%	82.55%	81.98%		
Influent BOD (mg/L)			221.0	210.0			
Primary BOD (mg/L)			165.0	171.0			
Secondary BOD (mg/L)			3.0	6.0			
% PRIMARY REMOVAL			25.3	18.6			
% SECONDARY REMOVAL			98.6	97.1			
Influent SS (mg/L)	125.0	171.0	171.0	192.0	287.0		
Primary SS (mg/L)	36.0	59.0	87.0	76.0			
Secondary SS (mg/L)	4.0	15.0	6.0	12.0	20.0		
% PRIMARY REMOVAL	71.2	65.5	49.1	60.4			
% SECONDARY REMOVAL	96.8	91.2	96.5	93.7	93.0		
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)	6.80	8.80	5.50	4.00			
Primary Total P (mg/L)							
Secondary Total P (mg/L)	1.00	1.00	0.30	0.40			
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	85.3	88.6	94.5	90.0			

NOTE : Values for BOD, SS, Total P are taken from Section One.
(Greenway is sub-divided into three sections - see schematic)

OPERATIONAL EVALUATION FOR: LONDON GREENWAY WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: July 10, 1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 122,700 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
RAW SEWAGE FLOW	105,197	113,289	109,334	95,650	102,514	88,058	86,785
% of Design Flow	85.74%	92.33%	89.11%	77.95%	83.55%	71.77%	70.73%
Influent BOD (mg/L)		280.0	194.0			110.0	134.0
Primary BOD (mg/L)		164.0	152.0				104.0
Secondary BOD (mg/L)		14.0	10.0			5.0	6.0
% PRIMARY REMOVAL		41.4%	21.6%				22.4%
% SECONDARY REMOVAL		95.0%	94.8%			95.5%	95.5%
Influent SS (mg/L)	318.0	275.0	328.0	1079.0	342.0		137.0
Primary SS (mg/L)	66.0	74.0	66.0	122.0	82.0		58.0
Secondary SS (mg/L)	21.0	15.0	12.0	17.0	17.0		9.0
% PRIMARY REMOVAL	79.2%	73.1%	79.9%	88.7%	76.0%		57.7%
% SECONDARY REMOVAL	93.4%	94.5%	96.3%	98.4%	95.0%		93.4%
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)	8.10	9.10	9.40	25.00			4.40
Primary Total P (mg/L)							
Secondary Total P (mg/L)	0.90	0.70	1.00	0.70			0.30
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	88.9%	92.3%	89.4%	97.2%			93.2%

NOTE : Values for BOD, SS, Total P are taken from Section One.
(Greenway is sub-divided into three sections - see schematic)

OPERATIONAL EVALUATION FOR: LONDON GREENWAY WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: July 10, 1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 122,700 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 8	DAY 9	DAY 10	DAY 11	DAY 12	DAY 13	DAY 14
RAW SEWAGE FLOW	99,241	102,196	94,695	101,787	102,196	94,650	83,557
% of Design Flow	80.88%	83.29%	77.18%	82.96%	83.29%	77.14%	68.10%
Influent BOD (mg/L)			262.0	176.0			198.0
Primary BOD (mg/L)			131.0	149.0			90.0
Secondary BOD (mg/L)			4.0	4.0			2.0
% PRIMARY REMOVAL			50.0%	15.3%			54.5%
% SECONDARY REMOVAL			98.5%	97.7%			99.0%
Influent SS (mg/L)	372.0	260.0	329.0	145.0	209.0	122.0	89.0
Primary SS (mg/L)	100.0		74.0	51.0	66.0		40.0
Secondary SS (mg/L)	13.0	3.0	6.0	6.0	16.0	9.0	9.0
% PRIMARY REMOVAL	73.1%		77.5%	64.8%	68.4%		55.1%
% SECONDARY REMOVAL	96.5%	98.8%	98.2%	95.9%	92.3%	92.6%	89.9%
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)	10.30	8.10	8.10				3.80
Primary Total P (mg/L)							
Secondary Total P (mg/L)	1.00	0.60	0.40				0.40
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	90.3%	92.6%	95.1%				89.5%

NOTE : Values for BOD, SS, Total P are taken from Section One.
(Greenway is sub-divided into three sections - see schematic)

OPERATIONAL EVALUATION FOR: LONDON GREENWAY WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: July 10, 1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 122,700 m3/d

PARAMETER	SAMPLING PERIOD						
	DAY 15	DAY 16	DAY 17	DAY 18	DAY 19	DAY 20	DAY 21
RAW SEWAGE FLOW	92,604	110,834	105,378	102,605	109,834		
% of Design Flow	75.47%	90.33%	85.88%	83.62%	89.51%		
Influent BOD (mg/L)		368.0	209.0	166.0			
Primary BOD (mg/L)		308.0	165.0	56.0			
Secondary BOD (mg/L)		4.0	13.0	6.0			
% PRIMARY REMOVAL		16.3	21.1	66.3			
% SECONDARY REMOVAL		98.9	93.8	96.4			
Influent SS (mg/L)	311.0	200.0	279.0	166.0	230.0		
Primary SS (mg/L)	69.0	75.0	78.0	56.0	70.0		
Secondary SS (mg/L)	10.0	11.0	19.0	6.0	2.0		
% PRIMARY REMOVAL	77.8	62.5	72.0	66.3	69.6		
% SECONDARY REMOVAL	96.8	94.5	93.2	96.4	99.1		
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)	6.90	6.50	6.00	5.00			
Primary Total P (mg/L)							
Secondary Total P (mg/L)	0.70	0.90	0.40	0.30			
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	89.9	86.2	93.3	94.0			

NOTE : Values for BOD, SS, Total P are taken from Section One.
(Greenway is sub-divided into three sections - see schematic)

PLANT NAME : London (Greenway)
PLANT TYPE : Secondary

SAMPLING TYPE : Raw Sewage
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	PLANT MIN. CONC. > N.DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0	163.00	345.00	9	9	100.0	267	266	99.6	258.72	140.23	1.27	1.93	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0	250.00	644.00	10	10	100.0	260	258	99.2	447.72	287.75	1.36	1.82	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0	24.50	104.00	9	9	100.0	271	271	100.0	50.51	22.39	1.93	1.81	100.0
NNHTFR	AMMONIUM,TOTAL FILT.REAC.	mg/L	0	11.10	16.10	10	10	100.0	275	274	99.6	14.21	15.37	1.14	1.69	100.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0	20.00	29.00	10	10	100.0	273	273	100.0	25.40	25.44	1.13	1.47	100.0
PH	(-LOG(H+(CONCN))		0	6.20	6.77	10	10	100.0	275	275	100.0	6.50	6.90	1.03	1.05	100.0
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/L	0	4.63	8.20	11	11	100.0	248	248	100.0	5.79	5.18	1.16	1.51	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0	122.00	326.00	9	9	100.0	267	266	99.6	183.83	126.88	1.41	1.93	100.0
RSPLOI	RESIDUE,PAR.LOSS ON IGNI.	mg/L	0	86.20	221.00	5	5	100.0	90	89	98.9	144.01	100.84	1.45	1.78	100.0
NNO2FR	NITRITE,FIL.T. REACT.	mg/L	0	0.03	0.03	9	3	33.3	271	58	21.4	0.01	0.01	2.37	2.98	51.4
PHNOL	PHENOLICS (4AAP)	mg/L	0	0.68	3.90	10	2	20.0	275	37	13.5	0.36	0.31	2.44	2.05	37.8
METALS																
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	1600.00	3900.00	12	12	100.0	322	306	95.0	2350.00	1000.10	1.33	2.65	97.3
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	110.00	430.00	12	12	100.0	322	237	73.6	170.00	51.10	1.45	3.44	89.2
CUUT	COPPER,UNFILT.TOTAL	ug/L	0	80.00	120.00	2	2	100.0	49	48	98.0	100.00	110.60	1.29	2.28	97.1
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	0.22	0.42	10	10	100.0	283	274	96.8	0.29	0.23	1.27	2.11	100.0
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	130.00	220.00	11	11	100.0	319	318	99.7	180.00	370.70	1.16	2.14	100.0
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	140.00	330.00	12	12	100.0	322	315	97.8	220.00	211.00	1.35	2.94	100.0
NIUT	NICKEL,UNFILT.TOTAL	ug/L	0	50.00	110.00	12	8	66.7	322	103	32.0	50.00	38.80	1.65	2.70	54.1
AGUT	SILVER,UNFILT.TOTAL	ug/L	0	10.00	20.00	11	3	27.3	321	82	25.6	10.00	10.40	1.60	2.55	75.7
CDUT	CADMIUM,UNFILT.TOTAL	ug/L	0	10.00	10.00	12	1	8.3	322	76	23.6	10.00	6.50	1.05	2.09	70.3
COUT	COBALT,UNFILT.TOTAL	ug/L	0	20.00	20.00	12	1	8.3	322	82	25.5	10.00	9.30	1.54	2.31	83.8
MOUT	MOLYBDENUM,UNFILT.TOTAL	ug/L	0	50.00	50.00	12	1	8.3	321	41	12.8	10.00	12.40	1.39	1.72	56.8
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PMMCRE	M-CRESOL	ug/L	1	17.60	282.00	10	8	80.0	275	167	60.7	44.70	25.59	3.87	3.45	88.5
PMPHEN	PHENOL	ug/L	2	15.70	43.60	10	7	70.0	275	118	42.9	16.70	14.52	1.90	2.46	78.4
PM4NP	4-NITROPHENOL	ug/L	2	53.30	53.30	10	1	10.0	275	3	1.1	14.45	12.65	1.58	1.29	8.1
DIOXINS AND FURANS																
P8CDD	OCTACHLORODIBENZODIOXIN	ng/L	1	28.00	28.00	2	1	50.0	54	4	7.4	5.29	0.87	10.55	3.66	10.8
PESTICIDES,HERBICIDES,PCBS																
P24D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	0.06	0.34	10	5	50.0	276	214	77.5	0.06	0.13	3.31	3.72	100.0
P1BHCG	GAMMA-BHC(HEXACHLORCYCLOHEXANE)	ug/L	2	0.04	0.07	10	4	40.0	276	143	51.8	0.02	0.02	2.53	2.29	94.6
P245T	2,4,5-TRICLORPHENOXYACETIC ACID	ug/L	3	0.13	0.27	10	2	20.0	276	22	8.0	0.07	0.06	1.79	1.60	37.8
P1MIRX	MIREX	ug/L	1	0.20	0.20	10	1	10.0	276	6	2.2	0.01	0.01	2.58	1.38	10.8
P1PPDT	PP-DDT	ug/L	3	0.08	0.08	10	1	10.0	276	9	3.3	0.05	0.04	2.09	1.35	18.9
VOLATILES ORGANIC COMPOUNDS																
X1TRIC	TRICHLOROETHYLENE	ug/L	1	100.00	120.00	10	2	20.0	274	15	5.5	28.10	22.59	2.05	1.82	16.2
X1CHLO	CHLOROFORM	ug/L	1	41.00	41.00	10	1	10.0	274	28	10.2	21.49	23.90	1.25	1.75	32.4

PLANT NAME : London (Greenway)
PLANT TYPE : Secondary

SAMPLING TYPE : Final Effluent
SAMPLE FORM : Wet Weight

CONTAMINANT	CONTAMINANT NAME	UNITS	QC CODE	STD. FOR SURFACE WATER	STD. REF.	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET.	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																		
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0		-	9.30	72.00	9	9	100.0	213	211	99.1	27.37	21.22	2.00	2.07	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0		-	38.00	112.00	10	10	100.0	213	211	99.1	66.81	52.80	1.43	1.83	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0		-	6.00	9.10	9	9	100.0	220	220	100.0	7.56	8.09	1.17	1.60	100.0
NNHTFR	AMMONIUM,TOTAL FILT.REAC.	mg/L	0		-	0.60	5.70	10	10	100.0	223	204	91.5	2.30	3.90	2.43	6.98	100.0
NNO2FR	NITRITE,FILT. REACT.	mg/L	0		-	0.31	1.28	9	9	100.0	220	194	88.2	0.66	0.22	1.71	5.95	98.4
NNO3FR	NITRATES,TOTAL FILT.REAC.	mg/L	0		-	1.30	8.13	10	10	100.0	224	186	83.0	3.01	2.33	1.79	7.75	98.4
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0		-	2.30	8.40	10	10	100.0	222	222	100.0	5.12	7.97	1.68	2.71	100.0
PH	(-LOG(H+(CONCN))		0		-	6.39	7.11	10	10	100.0	224	224	100.0	6.76	7.10	1.04	1.05	100.0
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/L	0		-	0.31	1.28	11	11	100.0	211	206	97.6	0.58	0.68	1.53	1.97	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0		-	7.50	15.20	9	9	100.0	220	219	99.6	10.89	10.12	1.28	2.00	100.0
RSPLOI	RESIDUE,PAR.LOSS ON IGNI.	mg/L	0		-	5.70	12.00	5	5	100.0	77	58	75.3	7.70	7.47	1.35	2.71	93.3
PHNOL	PHENOLICS (4AAP)	mg/L	0	0.00	ONT-MOE	0.14	0.21	10	2	20.0	225	33	14.7	0.06	0.07	1.70	1.86	53.6
METALS																		
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	100.00	ONT-MOE	10.00	20.00	12	12	100.0	267	137	51.3	10.00	9.00	1.43	2.00	89.3
CUUT	COPPER,UNFILT.TOTAL	ug/L	0	5.00	ONT-MOE	10.00	20.00	2	2	100.0	47	30	63.8	10.00	13.10	1.33	2.56	77.8
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	0.20	ONT-MOE	0.01	0.03	10	10	100.0	233	220	94.4	0.02	0.03	1.42	2.62	100.0
NIUT	NICKEL,UNFILT.TOTAL	ug/L	0	25.00	ONT-MOE	20.00	490.00	12	12	100.0	267	171	64.0	50.00	22.10	2.27	3.60	85.7
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	3750.00	ONT-MOE	140.00	210.00	12	12	100.0	267	267	100.0	160.00	340.90	1.13	2.14	100.0
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	30.00	ONT-MOE	20.00	60.00	12	12	100.0	267	262	98.1	40.00	53.30	1.46	2.48	100.0
MOUT	MOLYBDENUM,UNFILT.TOTAL	ug/L	0		-	10.00	20.00	12	7	58.3	267	75	28.1	10.00	6.60	1.57	1.56	67.9
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	75.00	ONT-MOE	170.00	190.00	12	6	50.0	264	196	74.2	40.00	101.70	4.50	3.72	96.4
CDUT	CADMIUM,UNFILT.TOTAL	ug/L	0	0.20	ONT-MOE	0.00	0.00	12	2	16.7	267	65	24.3	0.00	2.10	1.57	2.07	71.4
PBUT	LEAD,UNFILT.TOTAL	ug/L	0	25.00	ONT-MOE	20.00	50.00	12	2	16.7	267	25	9.4	10.00	16.50	1.56	1.48	60.7
CCNFUR	CYANIDE-FREE,UNFILT.REAC.	ug/L	0	5.00	ONT-MOE	10.00	10.00	10	1	10.0	222	42	18.9	0.00	1.30	2.87	3.68	46.4
COUT	COBALT,UNFILT.TOTAL	ug/L	0	5.00	NYS-STD	10.00	10.00	12	1	8.3	266	65	24.4	10.00	6.40	1.22	1.54	82.1
DIOXINS AND FURANS																		
P98CDD	OCTACHLORODIBENZODIOXIN	ng/L	1	150.00	ONT-MOE	0.55	0.55	2	1	50.0	44	4	9.1	0.26	0.31	2.83	3.43	14.3
PESTICIDES,HERBICIDES,PCBS																		
P324D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	4.00	ONT-MOE	0.02	2.30	10	8	80.0	227	177	78.0	0.06	0.08	5.06	4.71	100.0
P1BHCG	GAMMA-BHC(HEXACHLORCYCLHEXANE)	ug/L	2	0.06	ONT-MOE	0.01	0.05	10	5	50.0	227	157	69.2	0.01	0.02	2.73	2.48	96.4
P1CHLA	ALPHA-CHLORDANE	ug/L	1	0.00	NYS-GUL	0.06	0.06	10	1	10.0	227	5	2.2	0.01	0.01	2.19	1.31	14.3
P1CHLG	GAMMA-CHLORDANE	ug/L	1	0.06	ONT-MOE	0.06	0.06	10	1	10.0	227	5	2.2	0.01	0.01	2.19	1.36	14.3
P1DMDT	METHOXYCHLOR	ug/L	1	0.04	ONT-MOE	0.10	0.10	10	1	10.0	227	31	13.7	0.03	0.04	1.55	2.72	35.7
P1HEPT	HEPTACHLOR	ug/L	3	0.00	ONT-MOE	0.02	0.02	10	1	10.0	227	2	0.9	0.01	0.01	1.55	1.16	7.1
P1PPDD	PP-DDD	ug/L	1	0.00	ONT-MOE	0.01	0.01	10	1	10.0	227	2	0.9	0.01	0.01	1.25	1.10	7.1
P1PPDE	PP-DDE	ug/L	1	0.00	ONT-MOE	0.02	0.02	10	1	10.0	227	7	3.1	0.01	0.01	1.55	1.28	17.9
P1PPDT	PP-DDT	ug/L	3	0.00	ONT-MOE	0.07	0.07	10	1	10.0	227	2	0.9	0.02	0.02	1.49	1.14	7.1
P124ST	2,4,5-TRICLORPHENOXYACETIC ACID	ug/L	3		-	0.08	0.08	10	1	10.0	227	25	11.0	0.03	0.03	1.44	2.27	42.9
VOLATILES ORGANIC COMPOUNDS																		
B2EBNZ	ETHYLBENZENE	ug/L	1	70.00	ONT-MOE	12.00	12.00	10	1	10.0	224	3	1.3	1.28	1.02	2.19	1.21	7.1

PLANT NAME : London (Greenway)
PLANT TYPE : Secondary

SAMPLING TYPE : Final Effluent
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	STD. FOR SURFACE WATER	STD. REF.	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET.	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
VOLATILES ORGANIC COMPOUNDS																		
B2MPXY	M-, AND P-XYLENES	ug/L	1	50.00	NYS-GUL	27.00	27.00	10	1	10.0	224	5	2.2	1.39	1.05	2.84	1.45	10.7
B2OXYL	O-XYLENE	ug/L	1	100.00	ONT-MOE	17.00	17.00	10	1	10.0	224	5	2.2	1.33	1.05	2.45	1.38	14.3
X1TRTR	TETRACHLOROETHYLENE	ug/L	1	0.70	NYS-GUL	17.00	17.00	10	1	10.0	224	18	8.0	1.33	1.18	2.45	1.93	32.1
X1TRIC	TRICHLOROETHYLENE	ug/L	1	3.00	NYS-GUL	12.00	12.00	10	1	10.0	224	17	7.6	1.28	1.12	2.19	1.55	21.4

PLANT NAME : London (Greenway)
PLANT TYPE : Secondary

SAMPLING TYPE : Raw Sludge
SAMPLE FORM : Dry Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS (DRY WEIGHT)	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
COD	CHEMICAL OXYGEN DEMAND	mg/kg	0	1509216.59	1520912.55	2	2	100.0	45	45	100.0	1515053.28	892221.45	1.01	3.19	100.0
NNHTPR	AMMONIUM,TOTAL FIL.T.REAC.	mg/kg	0	8352.53	14828.90	2	2	100.0	48	47	97.9	11129.19	5911.32	1.50	4.59	100.0
NNOTPR	NITRATES,TOTAL FIL.T.REAC.	mg/kg	0	31.69	40.32	2	2	100.0	48	43	89.6	35.74	25.44	1.19	2.21	93.9
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/kg	0	63364.06	69708.69	2	2	100.0	51	51	100.0	66460.61	36897.85	1.07	2.98	100.0
PH	(-LOG(H+(CONCN))	mg/kg	0	5.69	6.23	2	2	100.0	49	49	100.0	5.95	6.03	1.07	1.10	100.0
PPUT	PHOSPHORUS,UNFIL.T.TOTAL	mg/kg	0	23087.17	27419.35	2	2	100.0	42	42	100.0	25149.29	20347.70	1.13	4.43	100.0
RST	RESIDUE, TOTAL	mg/kg	0	7890.00	8680.00	2	2	100.0	51	51	100.0	8275.58	32783.51	1.07	1.81	100.0
RSTLOI	RESIDUE,TOT.LOSS ON IGNI.	mg/kg	0	5730.00	5940.00	2	2	100.0	51	51	100.0	5834.06	20803.05	1.03	1.77	100.0
PHENOL	PHENOLICS (4AAP)	mg/kg	0	218.89	218.89	2	1	50.0	50	41	82.0	117.78	82.34	2.40	3.54	85.3
METALS																
ALUT	ALUMINUM,UNFIL.T.TOTAL.	mg/kg	0	7178.71	8294.93	2	2	100.0	51	51	100.0	7716.66	9835.74	1.11	2.51	100.0
ASUT	ARSENIC,UNFIL.T.TOTAL.	mg/kg	0	3.80	4.61	2	2	100.0	51	50	98.0	4.19	6.13	1.15	2.01	97.1
CRUT	CHROMIUM,UNFIL.T.TOTAL.	mg/kg	0	446.13	817.97	2	2	100.0	51	50	98.0	604.09	301.43	1.54	3.68	97.1
CUUT	COPPER,UNFIL.T.TOTAL.	mg/kg	0	337.14	483.87	2	2	100.0	46	46	100.0	403.89	606.31	1.29	1.72	100.0
HGUT	MERCURY,UNFIL.T.TOTAL.	mg/kg	0	2.30	2.53	2	2	100.0	50	50	100.0	2.42	2.23	1.07	1.67	100.0
NIUT	NICKEL,UNFIL.T.TOTAL.	mg/kg	0	67.97	67.97	1	1	100.0	46	44	95.7	67.97	59.17	0.00	2.90	93.3
PBUT	LEAD,UNFIL.T.TOTAL.	mg/kg	0	42.63	96.32	2	2	100.0	49	48	98.0	64.08	173.99	1.78	2.24	96.9
SEUT	SELENIUM,UNFIL.T.TOTAL.	mg/kg	0	3.46	3.80	2	2	100.0	50	48	96.0	3.63	3.04	1.07	1.93	93.9
SRUT	STRONTIUM,UNFIL.T.TOTAL.	mg/kg	0	107.73	111.75	2	2	100.0	51	51	100.0	109.72	231.70	1.03	1.97	100.0
ZNUT	ZINC,UNFIL.T.TOTAL.	mg/kg	0	399.24	622.12	2	2	100.0	51	51	100.0	498.37	905.39	1.37	2.39	100.0
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PMMCRE	M-CRESOL	ug/kg	1	126742.70	403225.80	2	2	100.0	51	42	82.3	226066.20	116847.30	2.27	12.16	85.3
DIOXINS AND FURANS																
P98CDD	OCTACHLORODIBENZODIOXIN	ug/kg	1	4.20	7.30	2	2	100.0	50	25	50.0	5.50	8.50	1.48	3.60	58.8
PESTICIDES,HERBICIDES,PCBS																
P1PCBT	PCB, TOTAL	ug/kg	2	139.40	184.30	2	2	100.0	51	40	78.4	160.30	88.70	1.22	3.18	79.4
VOLATILE ORGANIC COMPOUNDS																
B2MPXY	M-, AND P-XYLENES	ug/kg	1	8365.00	8365.00	2	1	50.0	51	16	31.4	4390.20	1345.90	2.49	3.86	41.2
B2OXYL	O-XYLENE (C8H10)	ug/kg	1	5449.90	5449.90	2	1	50.0	51	8	15.7	3543.60	841.60	1.84	2.51	23.5
X1CHLO	CHLOROFORM (CHCL3)	ug/kg	1	12420.80	12420.80	2	1	50.0	51	12	23.5	5349.70	1225.10	3.29	4.24	35.3

PLANT NAME : London (Greenway)
PLANT TYPE : Secondary

SAMPLING TYPE : Treated Sludge
SAMPLE FORM : Dry Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS (DRY WEIGHT)	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
COD	CHEMICAL OXYGEN DEMAND	mg/kg	0	1360000.00	1360000.00	1	1	100.0	36	36	100.0	1360000.00	508097.94	0.00	4.65	100.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/kg	0	36500.00	41000.00	2	2	100.0	49	49	100.0	38684.62	38494.12	1.09	1.77	100.0
PH	(-LOG(H+(CONCN))	mg/kg	0	6.70	8.00	2	2	100.0	47	47	100.0	7.32	7.17	1.13	1.09	100.0
PHNOL	PHENOLICS (4AAP)	mg/kg	0	8.16	47.50	2	2	100.0	49	41	83.7	19.69	43.05	3.48	3.14	87.9
PPUT	PHOSPHORUS,UNFIL.T.TOTAL.	mg/kg	0	19410.00	3783160.00	2	2	100.0	43	43	100.0	270981.78	76638.67	41.61	6.91	100.0
RST	RESIDUE, TOTAL.	mg/kg	0	196100.00	200000.00	2	2	100.0	50	50	100.0	198040.40	80434.04	1.01	3.23	100.0
RSTLOI	RESIDUE,TOT.LOSS ON IGNI.	mg/kg	0	158800.00	169411.00	2	2	100.0	50	50	100.0	164019.71	43379.33	1.05	3.19	100.0
METALS																
AGUT	SILVER,UNFIL.T.TOTAL.	mg/kg	0	23.92	30.00	2	2	100.0	44	44	100.0	26.79	37.78	1.17	2.33	100.0
ALUT	ALUMINUM,UNFIL.T.TOTAL.	mg/kg	0	3008.67	6757.10	2	2	100.0	50	50	100.0	4508.87	10715.94	1.77	2.82	100.0
ASUT	ARSENIC,UNFIL.T.TOTAL.	mg/kg	0	2.35	2.80	2	2	100.0	50	49	98.0	2.57	5.40	1.13	2.06	97.1
CRUT	CHROMIUM,UNFIL.T.TOTAL.	mg/kg	0	356.96	481.55	2	2	100.0	50	50	100.0	414.60	333.06	1.24	3.59	100.0
CUUT	COPPER,UNFIL.T.TOTAL.	mg/kg	0	611.93	650.90	2	2	100.0	45	45	100.0	631.12	732.24	1.04	2.16	100.0
HGUT	MERCURY,UNFIL.T.TOTAL.	mg/kg	0	1.40	2.24	2	2	100.0	50	49	98.0	1.77	3.24	1.40	2.04	97.1
MOUT	MOLYBDENUM,UNFIL.T.TOTAL.	mg/kg	0	2.55	17.34	2	2	100.0	34	23	67.7	6.65	6.41	3.88	2.84	69.2
NIUT	NICKEL,UNFIL.T.TOTAL.	mg/kg	0	61.19	82.35	2	2	100.0	45	42	93.3	70.99	72.95	1.23	2.95	90.0
PBUT	LEAD,UNFIL.T.TOTAL.	mg/kg	0	49.46	99.30	2	2	100.0	50	49	98.0	70.08	196.62	1.64	2.46	97.1
SRUT	STRONTIUM,UNFIL.T.TOTAL.	mg/kg	0	50.59	95.20	2	2	100.0	50	50	100.0	69.40	240.93	1.56	2.54	100.0
ZNUT	ZINC,UNFIL.T.TOTAL.	mg/kg	0	448.75	508.95	2	2	100.0	50	50	100.0	477.90	988.90	1.09	2.57	100.0
CDUT	CADMIUM,UNFIL.T.TOTAL.	mg/kg	0	3.85	3.85	2	1	50.0	45	41	91.1	2.22	10.47	2.18	3.98	90.3
SEUT	SELENIUM,UNFIL.T.TOTAL.	mg/kg	0	2.05	2.05	2	1	50.0	50	48	96.0	0.40	2.67	10.23	2.98	97.1
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PMMCRE	M-CRESOL.	ug/kg	1	15500.00	480877.10	2	2	100.0	50	15	30.0	86334.20	5281.80	11.34	8.20	35.3
PMPHEN	PHENOL.	ug/kg	2	24987.30	24987.30	2	1	50.0	50	3	6.0	4329.00	2108.80	11.93	3.65	8.8
DIOXINS AND FURANS																
P97CDD	HEPTACHLORODIBENZODIOXIN	ug/kg	1	4.30	4.30	2	1	50.0	49	10	20.4	3.30	5.00	1.47	3.21	23.5
P98CDD	OCTACHLORODIBENZODIOXIN	ug/kg	1	16.00	16.00	2	1	50.0	49	26	53.1	4.00	7.10	7.10	3.84	64.7
PESTICIDES,HERBICIDES,PCBS																
P1CHLA	ALPHA-CHLORDANE	ug/kg	1	11.20	11.20	2	1	50.0	50	22	44.0	7.50	6.50	1.77	2.41	55.9
P1CHLG	GAMMA-CHLORDANE	ug/kg	1	13.90	13.90	2	1	50.0	50	21	42.0	8.30	6.80	2.06	2.58	52.9
P1END2	ENDOSULFAN II	ug/kg	3	35.70	35.70	2	1	50.0	50	7	14.0	13.50	4.70	3.96	2.67	20.6
P1PCBT	PCB, TOTAL.	ug/kg	2	2683.20	2683.20	2	1	50.0	50	32	64.0	366.30	114.10	16.71	4.58	67.7
P1PPDE	PP-DDE	ug/kg	1	11.70	11.70	2	1	50.0	50	34	68.0	7.60	11.10	1.82	2.72	73.5
P24D	2,4-DICHLOROPHENOXYACETIC ACID	ug/kg	3	61.70	61.70	2	1	50.0	50	25	50.0	39.70	75.00	1.87	5.81	64.7
X2124	1,2,4-TRICHLOROBENZENE	ug/kg	3	24.60	24.60	2	1	50.0	50	22	44.0	15.80	14.80	1.86	5.02	52.9

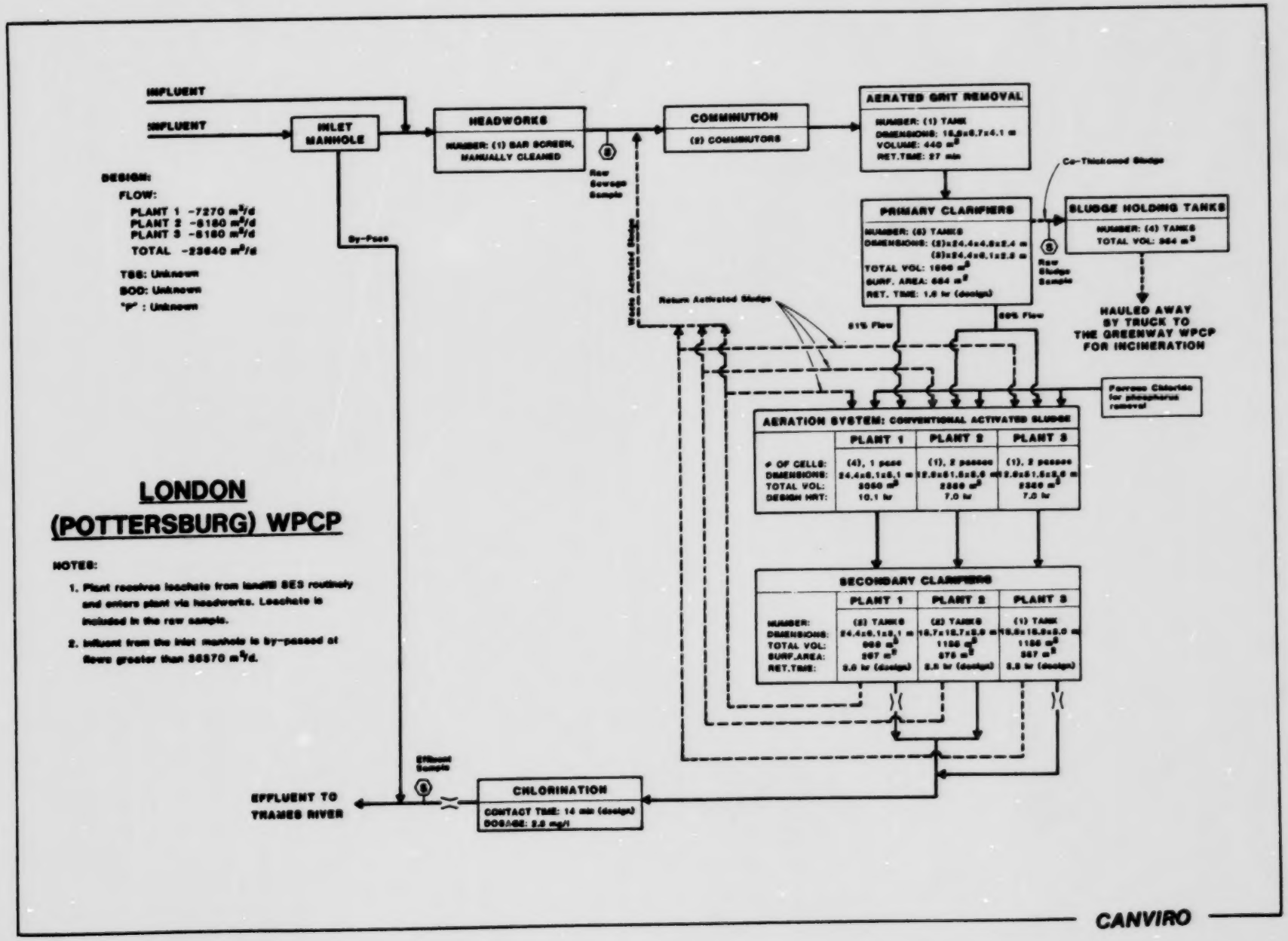
Sub-Appendix A-13

London (Pottersburg) WPCP

Contents:

- Plant Schematic with Design Characteristics
- Annual Data Review (1981 - 1986 Plant Performance)
- Sources of Municipal Water Pollution Control Plant Raw Sewage
- Operational Evaluation for London (Pottersburg) WPCP
- Analytical Data

(KIR18/28A)


INFLUENT
INFLUENT
INLET MANHOLE
HEADWORKS
NUMBER: (1) BAR SCREEN, MANUALLY CLEANED
Raw Sewage Sample
COMMINUTION
(2) COMMINUTORS
AERATED GRIT REMOVAL
NUMBER: (1) TANK
VOLUME: 440 m³
RET.TIME: 27 min
Co-Thickened Sludge
PRIMARY CLARIFIERS
NUMBER: (6) TANKS
TOTAL VOL: 1600 m³
SURF. AREA: 664 m²
RET. TIME: 1.6 hr (design)
Raw Sludge Sample
SLUDGE HOLDING TANKS
NUMBER: (4) TANKS
TOTAL VOL: 364 m³
HAULED AWAY BY TRUCK TO THE GREENWAY WPCP FOR INCINERATION
Waste Activated Sludge
Return Activated Sludge
81% Flow
60% Flow
Ferrous Chloride for phosphorus removal
AERATION SYSTEM: CONVENTIONAL ACTIVATED SLUDGE
PLANT 1
PLANT 2
PLANT 3
OF CELLS: (4), 1 pass (1), 2 passes (1), 2 passes
DIMENSIONS: 24.4x6.1x5.1 m 12.9x51.5x5.6 m 12.9x51.5x5.6 m
TOTAL VOL: 3050 m³ 2380 m³ 2380 m³
DESIGN HRT: 10.1 hr 7.0 hr 7.0 hr
SECONDARY CLARIFIERS
PLANT 1
PLANT 2
PLANT 3
NUMBER: (2) TANKS (2) TANKS (1) TANK
DIMENSIONS: 24.4x6.1x5.1 m 15.7x15.7x5.0 m 15.8x15.8x5.0 m
TOTAL VOL: 900 m³ 1150 m³ 1150 m³
SURF.AREA: 267 m² 375 m² 387 m²
RET.TIME: 3.0 hr (design) 3.8 hr (design) 3.8 hr (design)
By-Pass
Effluent Sample
CHLORINATION
CONTACT TIME: 14 min (design)
DOSAGE: 2.0 mg/l
EFFLUENT TO THAMES RIVER
DESIGN:
FLOW:
PLANT 1 -7270 m³/d
PLANT 2 -8180 m³/d
PLANT 3 -8180 m³/d
TOTAL -23640 m³/d
TSS: Unknown
BOD: Unknown
"P" : Unknown
LONDON (POTTERSBURG) WPCP
NOTES:
1. Plant receives leachate from landfill SES routinely and enters plant via headworks. Leachate is included in the raw sample.
2. Influent from the inlet manhole is by-passed at flows greater than 36370 m³/d.
CANVIRO

POTTERSBURG WPCP
Conventional Activated Sludge
Phosphorus Removal - Continuous
Capacity - 22.848 10(3)m3/day

PARAMETER	1981	1982	1983	1984	1985	MEAN ANNUAL AVERAGE
Avg. Daily Flow (1000 m3/day)	13.58	17.28	17.93	17.37	17.41	16.78
BOD5 - Influent (mg/L)	76.18	77.00	78.00	88.00	94.92	79.60
BOD5 - Effluent (mg/L)	3.40	4.00	2.60	2.92	2.75	3.13
Annual BOD5 Significantly Different from Mean Annual Average BOD5?	I.D.	I.D.	I.D.	I.D.	I.D.	
TSS - Influent (mg/L)	124.50	116.30	104.00	104.25	102.00	110.21
TSS - Effluent (mg/L)	5.40	5.10	4.00	4.17	3.92	4.60
Annual TSS Significantly Different from Mean Annual Average TSS?	I.D.	I.D.	I.D.	I.D.	I.D.	
Total P - Influent (mg/L)	5.10	4.40	11.50	4.43	4.03	6.07
Total P - Effluent (mg/L)	0.73	0.70	0.96	0.85	0.63	0.77
Annual TP Significantly Different from Mean Annual Average TP?	I.D.	I.D.	I.D.	I.D.	I.D.	
TP in Compliance?	Y	Y	Y	Y	Y	Y

I.D. - Insufficient Data

R

SOURCES OF MUNICIPAL WATER POLLUTION CONTROL PLANT RAW SEWAGE

GENERAL DESCRIPTION OF WATER POLLUTION CONTROL PLANT (WPCP)

NAME OF WPCP	POTTERSBURG WPCP
WORKS NUMBER	120000836
TREATMENT TYPE	CONVENTIONAL ACTIVATED SLUDGE PHOSPHORUS REMOVAL CONTINUOUS
DESIGN CAPACITY (1000 m3/d)	22.048
1986 AVERAGE DAY FLOW (1000 m3/d)	17.909
POPULATION SERVED	25979

% OF TOTAL FLOW ATTRIBUTED TO:

INDUSTRIAL SOURCES (%)	9
COMMERCIAL SOURCES (%) (Population x 0.0757)	11
RESIDENTIAL SOURCES (%) (Population x 0.175)	25
UNACCOUNTED FOR, INCL. INFILTRATION (100-% Contributed from industrial, commercial and residential sources)	55

PROFILE OF INDUSTRIES IN CATCHMENT

TOTAL NO OF INDUSTRIES	74
INDUSTRIES WITH WATER	45
NO OF SIC CATEGORIES	23

DESCRIPTION OF THE TOP 5 INDUSTRIES DISCHARGED TO THE WPCP (BASED ON WATER USE DATA)

DESCRIPTION	SIC	# OF COMPANIES
TRANSPORTATION EQ'T	3711-3799	2
ELECTRICAL AND ELECTRONIC CMTS	3612-3690	2
ELECTROPLATING	3471-3471	1
WOOD AND METAL FURNITURE MFG	2510-2599	2
MACHINERY MFG	3500-3599	16

R

OPERATIONAL EVALUATION FOR: LONDON POTTERSBURG WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: July 10, 1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 23,640 m3/d

PARAMETER	PRE-SAMPLING PERIOD DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
RAW SEWAGE FLOW	17,684	14,729	14,729	13,957	14,411	12,456	12,229
% of Design Flow	74.81%	62.31%	62.31%	59.04%	60.96%	52.69%	51.73%
Influent BOD (mg/L)		134.0	104.0				113.0
Primary BOD (mg/L)		89.0	83.0				137.0
Secondary BOD (mg/L)		4.0	5.0				3.0
% PRIMARY REMOVAL		33.6%	20.2%				-21.2%
% SECONDARY REMOVAL		97.0%	95.2%				97.3%
Influent SS (mg/L)	159.0	177.0	100.0	112.0			164.0
Primary SS (mg/L)	47.0	46.0	51.0	44.0			121.0
Secondary SS (mg/L)	4.0	3.0	2.0	2.0			2.0
% PRIMARY REMOVAL	70.4%	74.0%	49.0%	60.7%			26.2%
% SECONDARY REMOVAL	97.5%	98.3%	98.0%	98.2%			98.8%
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)	7.10	5.30	6.20	5.60			7.20
Primary Total P (mg/L)							
Secondary Total P (mg/L)	0.80	0.70	0.80	0.90			0.60
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	88.7%	86.8%	87.1%	83.9%			91.7%

NOTE : Values for BOD, SS Total P are taken from Section One.
(Pottersburg is sub-divided into three sections - see schematic)

OPERATIONAL EVALUATION FOR: LONDON POTTERSBURG WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: July 10, 1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 23,640 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 8	DAY 9	DAY 10	DAY 11	DAY 12	DAY 13	DAY 14
RAW SEWAGE FLOW	15,093	14,366	13,456	15,457	13,229		
% of Design Flow	63.85%	60.77%	56.92%	65.38%	55.96%		
Influent BOD (mg/L)			194.0	171.0			216.0
Primary BOD (mg/L)			116.0	111.0			216.0
Secondary BOD (mg/L)			4.0	3.0			1.0
% PRIMARY REMOVAL			40.2%	35.1%			0.0%
% SECONDARY REMOVAL			97.9%	98.2%			99.5%
Influent SS (mg/L)	156.0		156.0	131.0			103.0
Primary SS (mg/L)	78.0		80.0	66.0			49.0
Secondary SS (mg/L)	3.0		3.0	3.0			3.0
% PRIMARY REMOVAL	50.0%		48.7%	49.6%			52.4%
% SECONDARY REMOVAL	98.1%		98.1%	97.7%			97.1%
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)	6.80		7.60	7.80			6.40
Primary Total P (mg/L)							
Secondary Total P (mg/L)	0.60		0.70	0.90			0.80
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	91.2%		90.8%	88.5%			87.5%

NOTE : Values for BOD, SS Total P are taken from Section One.
(Pottersburg is sub-divided into three sections - see schematic)

OPERATIONAL EVALUATION FOR: LONDON POTTERSBURG WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: July 10, 1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 23,640 m3/d

PARAMETER	SAMPLING PERIOD DAY 15	DAY 16	DAY 17	DAY 18	DAY 19	DAY 20	DAY 21
RAW SEWAGE FLOW	14,411	14,457	13,775	13,411	12,820		
% of Design Flow	60.96%	61.15%	58.27%	56.73%	54.23%		
Influent BOD (mg/L)		167.0	120.0				
Primary BOD (mg/L)		107.0	39.0				
Secondary BOD (mg/L)		4.0	4.0				
% PRIMARY REMOVAL		35.9	67.5				
% SECONDARY REMOVAL		97.6	96.7				
Influent SS (mg/L)		107.0	90.0	156.0			
Primary SS (mg/L)		69.0	59.0	59.0			
Secondary SS (mg/L)		5.0	4.0	7.0			
% PRIMARY REMOVAL		35.5	34.4	62.2			
% SECONDARY REMOVAL		95.3	95.6	95.5			
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)	6.80	5.90	6.70				
Primary Total P (mg/L)							
Secondary Total P (mg/L)	0.90	1.30	1.30				
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	86.8	78.0	80.6				

NOTE : Values for BOD, SS Total P are taken from Section One.
(Pottersburg is sub-divided into three sections - see schematic)

OPERATIONAL EVALUATION FOR: LONDON POTTERSBURG WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: February 20,1987
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: 23,640 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
RAW SEWAGE FLOW	15,466	15,638	14,548	15,048	15,957	14,820	15,366
% of Design Flow	65.42%	66.15%	61.54%	63.65%	67.50%	62.69%	65.00%
Influent BOD (mg/L)		114.0	38.0	117.0			
Primary BOD (mg/L)		79.0	70.0	101.0			
Secondary BOD (mg/L)		3.0	3.0	3.0			
% PRIMARY REMOVAL		30.7	-84.2	13.7			
% SECONDARY REMOVAL		97.4	92.1	97.4			
Influent SS (mg/L)	128.0	133.0	102.0	106.0			101.0
Primary SS (mg/L)	64.0	51.0	54.0	59.0			41.0
Secondary SS (mg/L)	8.0	8.0	5.0	6.0			4.0
% PRIMARY REMOVAL	50.0	61.7	47.1	44.3			59.4
% SECONDARY REMOVAL	93.8	94.0	95.1	94.3			96.0
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)	3.8	4.8	4.5	4.2			5.0
Primary Total P (mg/L)							
Secondary Total P (mg/L)	0.6	0.9	0.6	0.4			0.6
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	84.2	81.3	86.7	90.5			88.0

OPERATIONAL EVALUATION FOR: LONDON POTTERSBURG WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: February 20,1987
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: 23,640 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 8	DAY 9	DAY 10	DAY 11	DAY 12	DAY 13	DAY 14
RAW SEWAGE FLOW	15,729	15,639	15,911	16,230	15,457	14,320	14,184
% of Design Flow	66.54%	66.15%	67.31%	68.65%	65.38%	60.58%	60.00%
Influent BOD (mg/L)		86.0	95.0	116.0			
Primary BOD (mg/L)		74.0	80.0	100.0			
Secondary BOD (mg/L)		3.0	2.0	3.0			
% PRIMARY REMOVAL		14.0	15.8	13.8			
% SECONDARY REMOVAL		96.5	97.9	97.4			
Influent SS (mg/L)	64.0	105.0	109.0	130.0			106.0
Primary SS (mg/L)	42.0	53.0	56.0	65.0			43.0
Secondary SS (mg/L)	3.0	5.0	7.0	7.0			8.0
% PRIMARY REMOVAL	34.4	49.5	48.6	50.0			59.4
% SECONDARY REMOVAL	95.3	95.2	93.6	94.6			92.5
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)	4.3	5.5	3.8	4.7			4.3
Primary Total P (mg/L)							
Secondary Total P (mg/L)	0.5	0.8	0.8	0.4			0.5
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	88.4	85.5	78.9	91.5			88.4

OPERATIONAL EVALUATION FOR: LONDON POTTERSBURG WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: February 20,1987
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: 23,640 m3/d

PARAMETER	SAMPLING PERIOD DAY 15	DAY 16	DAY 17	DAY 18	DAY 19	DAY 20	DAY 21
RAW SEWAGE FLOW	14,638	14,821	14,275	13,547	14,366	13,502	13,547
% of Design Flow	61.92%	62.69%	60.38%	57.31%	60.77%	57.12%	57.31%
Influent BOD (mg/L)		86.0	131.0	110.0			
Primary BOD (mg/L)		81.0	113.0	111.0			
Secondary BOD (mg/L)		3.0	3.0	3.0			
% PRIMARY REMOVAL		5.8	13.7	-0.9			
% SECONDARY REMOVAL		96.5	97.7	97.3			
Influent SS (mg/L)	110.0	111.0	126.0	108.0			186.0
Primary SS (mg/L)	57.0	52.0	52.0	54.0			36.0
Secondary SS (mg/L)	7.0	7.0	6.0	9.0			9.0
% PRIMARY REMOVAL	48.2	53.2	58.7	50.0			80.6
% SECONDARY REMOVAL	93.6	93.7	95.2	91.7			95.2
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)							
Primary Total P (mg/L)							
Secondary Total P (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							

PLANT NAME : London (Pottersburg)
PLANT TYPE : Secondary

SAMPLING TYPE : Raw Sewage
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	PLANT MIN. CONC. > MDL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0	132.00	288.00	9	9	100.0	267	266	99.6	189.90	140.23	1.32	1.93	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0	194.00	630.00	9	9	100.0	260	258	99.2	395.52	287.75	1.52	1.82	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0	20.00	67.50	10	10	100.0	271	271	100.0	35.15	22.39	1.55	1.81	100.0
NNHTPR	AMMONIUM,TOTAL FILT.REAC.	mg/L	0	17.70	29.20	10	10	100.0	275	274	99.6	22.30	15.37	1.20	1.69	100.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0	25.50	38.30	9	9	100.0	273	273	100.0	31.29	25.44	1.14	1.47	100.0
PH	(-LOG(H+(CONCN))		0	6.63	7.34	10	10	100.0	275	275	100.0	6.91	6.90	1.03	1.05	100.0
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/L	0	2.40	6.15	11	11	100.0	248	248	100.0	4.80	5.18	1.29	1.51	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0	45.80	264.00	10	10	100.0	267	266	99.6	117.81	126.88	1.74	1.93	100.0
RSPLOI	RESIDUE,PAR.LOSS ON IGNI.	mg/L	0	89.20	183.00	5	5	100.0	90	89	98.9	128.59	100.84	1.30	1.78	100.0
NNOTPR	NITRATES,TOTAL FILT.REAC.	mg/L	0	0.25	0.25	10	1	10.0	275	28	10.2	0.05	0.05	2.05	2.33	32.4
METALS																
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	390.00	2200.00	12	12	100.0	322	306	95.0	600.00	1000.10	1.57	2.65	97.3
CUUT	COPPER,UNFILT.TOTAL	ug/L	0	70.00	100.00	2	2	100.0	49	48	98.0	80.00	110.60	1.27	2.28	97.1
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	0.06	0.23	10	10	100.0	283	274	96.8	0.11	0.23	1.54	2.11	100.0
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	180.00	310.00	12	12	100.0	319	318	99.7	230.00	370.70	1.19	2.14	100.0
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	80.00	240.00	12	12	100.0	322	315	97.8	130.00	211.00	1.45	2.94	100.0
AGUT	SILVER,UNFILT.TOTAL	ug/L	0	20.00	50.00	12	9	75.0	321	82	25.6	20.00	10.40	2.26	2.55	75.7
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	20.00	80.00	12	8	66.7	322	237	73.6	30.00	51.10	2.39	3.44	89.2
CDUT	CADMIUM,UNFILT.TOTAL	ug/L	0	10.00	20.00	12	2	16.7	322	76	23.6	10.00	6.50	1.58	2.09	70.3
COUT	COBALT,UNFILT.TOTAL	ug/L	0	30.00	30.00	12	2	16.7	322	82	25.5	10.00	9.30	2.01	2.31	83.8
PBUT	LEAD,UNFILT.TOTAL	ug/L	0	100.00	140.00	12	2	16.7	322	57	17.7	60.00	59.50	1.48	1.86	51.4
MOUT	MOLYBDENUM,UNFILT.TOTAL	ug/L	0	20.00	20.00	12	1	8.3	321	41	12.8	10.00	12.40	1.22	1.72	56.8
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PM04CRE	M-CRESOL	ug/L	1	25.60	353.30	10	5	50.0	275	167	60.7	30.57	25.59	5.24	3.45	86.5
PMPHEN	PHENOL	ug/L	2	17.90	62.40	10	3	30.0	275	118	42.9	12.44	14.52	2.41	2.46	78.4
PNNAPH	NAPHTHALENE	ug/L	1	11.40	46.90	10	3	30.0	275	16	5.8	8.13	5.57	2.35	1.47	21.6
PMBBP	BUTYLBENZYLPHTHALATE	ug/L	1	44.50	44.50	10	1	10.0	275	34	12.4	6.22	5.85	2.00	1.66	37.8
DIOXINS AND FURANS																
P8CDF	OCTACHLORODIBENZOFURAN	ng/L	1	3.00	3.00	2	1	50.0	54	1	1.9	1.73	0.79	2.17	2.87	2.7
PESTICIDES,HERBICIDES,PCBS																
P324D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	0.07	1.00	10	10	100.0	276	214	77.5	0.16	0.13	2.46	3.72	100.0
P1BHCG	GAMMA-BHC(HEXCHLORCYCLHEXANE)	ug/L	2	0.02	0.05	10	8	80.0	276	143	51.8	0.02	0.02	1.79	2.29	94.6
P1PCBT	PCB, TOTAL	ug/L	2	0.12	0.24	10	2	20.0	276	42	15.2	0.05	0.06	1.88	2.31	46.9
P1BHCB	BETA-BHC (HEXCHLORCYCLHEXANE)	ug/L	1	0.04	0.04	10	1	10.0	276	32	11.6	0.01	0.01	1.55	1.66	35.1
P1DMDT	METHOXYCHLOR	ug/L	1	0.10	0.10	10	1	10.0	276	47	17.0	0.05	0.08	1.25	3.14	43.2
P1OCHL	OXYCHLORDANE	ug/L	2	0.05	0.05	10	1	10.0	276	2	0.7	0.01	0.01	1.66	1.23	5.4
P1PPDE	PP-DDE	ug/L	1	0.02	0.02	10	1	10.0	276	15	5.4	0.01	0.01	1.25	1.74	24.3
P1PPDT	PP-DDT	ug/L	3	0.12	0.12	10	1	10.0	276	9	3.3	0.04	0.04	1.42	1.35	18.9
P324ST	2,4,5-TRICLORPHENOXYACETIC ACID	ug/L	3	0.20	0.20	10	1	10.0	276	22	8.0	0.06	0.06	1.55	1.60	37.8
P5SILV	SILVEX	ug/L	3	0.17	0.17	10	1	10.0	276	28	10.1	0.06	0.06	1.47	1.68	40.5

PLANT NAME : London (Pottersburg)
PLANT TYPE : Secondary

SAMPLING TYPE : Raw Sewage
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	PLANT MIN. CONC. > MDL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
PESTICIDES,HERBICIDES,PCBS																
X1HCCP	HEXACHLOROCYCLOPENTADIENE	ug/L	3	0.30	0.30	10	1	10.0	276	5	1.8	0.11	0.10	1.42	1.30	13.5
X2124	1,2,4-TRICHLOROBENZENE	ug/L	3	0.07	0.07	10	1	10.0	276	35	12.7	0.01	0.01	1.85	2.48	46.5
VOLATILES ORGANIC COMPOUNDS																
B2ERNZ	ETHYLBENZENE	ug/L	1	58.00	58.00	10	1	10.0	274	30	11.0	22.25	23.50	1.40	1.75	29.7
B2MPXY	M-, AND P-XYLENES	ug/L	1	190.00	190.00	10	1	10.0	274	43	15.7	25.05	26.00	2.04	2.02	37.8
B2OXYL	O-XYLENE	ug/L	1	42.00	42.00	10	1	10.0	274	25	9.1	21.54	22.47	1.26	1.56	24.3

PLANT NAME : London (Pottersburg)
PLANT TYPE : Secondary

SAMPLING TYPE : Final Effluent
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	STD. FOR SURFACE WATER	STD. REF.	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET.	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																		
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0		-	11.30	34.00	8	8	100.0	213	211	99.1	20.94	21.22	1.60	2.07	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0		-	28.00	92.00	8	8	100.0	213	211	99.1	60.81	52.80	1.48	1.83	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0		-	5.00	8.60	9	9	100.0	220	220	100.0	6.80	8.09	1.20	1.60	100.0
NNO2FR	NITRITE,FILT. REACT.	mg/L	0		-	0.23	0.46	9	9	100.0	220	194	88.2	0.31	0.22	1.28	5.95	96.4
NNO3FR	NITRATES,TOTAL FILT.REAC.	mg/L	0		-	11.10	16.50	8	8	100.0	224	186	83.0	13.36	2.33	1.18	7.75	96.4
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0		-	1.00	4.00	8	8	100.0	222	222	100.0	1.76	7.97	1.71	2.71	100.0
PH	(-LOG(H+(CONC))		0		-	6.54	7.08	8	8	100.0	224	224	100.0	6.83	7.10	1.03	1.05	100.0
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/L	0		-	0.35	2.50	9	9	100.0	211	206	97.6	0.77	0.68	1.83	1.97	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0		-	5.10	11.50	9	9	100.0	220	219	99.6	7.30	10.12	1.30	2.00	100.0
NNHTFR	AMMONIUM,TOTAL FILT.REAC.	mg/L	0	.	-	0.35	1.40	8	5	62.5	223	204	91.5	0.20	3.90	5.79	6.98	100.0
RSPLOI	RESIDUE,PAR.LOSS ON IGNI.	mg/L	0		-	5.60	5.90	5	2	40.0	77	58	75.3	3.22	7.47	1.71	2.71	93.3
PHNOL	PHENOLICS (4AAP)	mg/L	0	0.00	ONT-MOE	0.26	0.26	10	1	10.0	225	33	14.7	0.06	0.07	1.68	1.86	53.6
METALS																		
CUUT	COPPER,UNFILT.TOTAL	ug/L	0	5.00	ONT-MOE	10.00	30.00	3	3	100.0	47	30	63.8	20.00	13.10	1.52	2.56	77.8
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	3750.00	ONT-MOE	180.00	310.00	12	12	100.0	267	267	100.0	220.00	340.90	1.21	2.14	100.0
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	30.00	ONT-MOE	20.00	50.00	12	12	100.0	267	262	98.1	30.00	53.30	1.37	2.48	100.0
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	0.20	ONT-MOE	0.01	0.02	10	8	80.0	233	220	94.4	0.01	0.03	1.73	2.62	100.0
MOUT	MOLYBDENUM,UNFILT.TOTAL	ug/L	0		-	10.00	20.00	12	7	58.3	267	75	28.1	10.00	6.60	1.54	1.56	67.9
NIUT	NICKEL,UNFILT.TOTAL	ug/L	0	25.00	ONT-MOE	10.00	20.00	12	7	58.3	267	171	64.0	10.00	22.10	1.71	3.60	85.7
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	75.00	ONT-MOE	60.00	140.00	12	5	41.7	264	196	74.2	30.00	101.70	3.34	3.72	96.4
CDUT	CADMIUM,UNFILT.TOTAL	ug/L	0	0.20	ONT-MOE	0.00	0.00	12	2	16.7	267	65	24.3	0.00	2.10	1.72	2.07	71.4
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	100.00	ONT-MOE	10.00	10.00	12	2	16.7	267	137	51.3	10.00	9.00	1.37	2.00	89.3
PBUT	LEAD,UNFILT.TOTAL	ug/L	0	25.00	ONT-MOE	30.00	30.00	12	2	16.7	267	25	9.4	20.00	16.50	1.72	1.48	60.7
COUT	COBALT,UNFILT.TOTAL	ug/L	0	5.00	NYS-STD	10.00	10.00	12	1	8.3	266	65	24.4	10.00	6.40	1.22	1.54	82.1
DIOXINS AND FURANS																		
P9CDF	OCTACHLORODIBENZOFURAN	ng/L	1	150.00	ONT-MOE	0.50	0.50	2	1	50.0	44	2	4.6	0.25	0.28	2.67	2.90	7.1
PESTICIDES,HERBICIDES,PCBS																		
P24D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	4.00	ONT-MOE	0.03	0.33	10	8	80.0	227	177	78.0	0.05	0.08	3.21	4.71	100.0
P1BHCG	GAMMA-BHC(HEXCHLORCYCLHEXANE)	ug/L	2	0.06	ONT-MOE	0.01	0.05	10	6	60.0	227	157	69.2	0.01	0.02	2.62	2.48	96.4
P245T	2,4,5-TRICLORPHENOXYACETIC ACID	ug/L	3		-	0.07	0.07	10	1	10.0	227	25	11.0	0.03	0.03	1.38	2.27	42.9
P5SILV	SILVEX	ug/L	3		-	0.12	0.12	10	1	10.0	227	23	10.1	0.03	0.03	1.64	1.83	50.0
X2124	1,2,4-TRICHLOROBENZENE	ug/L	3	0.50	ONT-MOE	0.03	0.03	10	1	10.0	227	36	15.9	0.01	0.01	1.76	2.44	32.1

PLANT NAME : London (Pottersburg)
PLANT TYPE : Secondary

SAMPLING TYPE : Raw Sludge
SAMPLE FORM : Dry Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS (DRY WEIGHT)	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
COD	CHEMICAL OXYGEN DEMAND	mg/kg	0	1401869.16	1503759.40	2	2	100.0	45	45	100.0	1451920.77	892221.45	1.05	3.19	100.0
NNHTPR	AMMONIUM,TOTAL FILT.REAC.	mg/kg	0	9398.50	18006.23	2	2	100.0	48	47	97.9	13008.90	5911.32	1.58	4.59	100.0
NNOTPR	NITRATES,TOTAL FILT.REAC.	mg/kg	0	22.56	74.77	2	2	100.0	48	43	89.6	41.07	25.44	2.33	2.21	93.9
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/kg	0	54517.13	58270.68	2	2	100.0	51	51	100.0	56362.67	36897.85	1.05	2.98	100.0
PH	(-1.0G(H+(CONCN))	mg/kg	0	5.68	5.68	2	2	100.0	49	49	100.0	5.68	6.03	1.00	1.10	100.0
PHENOL	PHENOLICS (4AAP)	mg/kg	0	43.61	97.74	2	2	100.0	50	41	82.0	65.29	82.34	1.77	3.54	85.3
PPUT	PHOSPHORUS,UNFIL.T.TOTAL	mg/kg	0	30563.91	33333.33	2	2	100.0	42	42	100.0	31918.60	20347.70	1.06	4.43	100.0
RST	RESIDUE, TOTAL	mg/kg	0	26600.00	32100.00	2	2	100.0	51	51	100.0	29220.88	32783.51	1.14	1.81	100.0
RSTLOI	RESIDUE,TOT.LOSS ON IGNI.	mg/kg	0	18100.00	21800.00	2	2	100.0	51	51	100.0	19864.04	20803.05	1.14	1.77	100.0
METALS																
AGUT	SILVER,UNFIL.T.TOTAL	mg/kg	0	132.40	154.14	2	2	100.0	45	40	88.9	142.85	30.17	1.11	2.61	84.4
ALUT	ALUMINUM,UNFIL.T.TOTAL	mg/kg	0	2706.77	4266.04	2	2	100.0	51	51	100.0	3398.12	9835.74	1.38	2.51	100.0
ASUT	ARSENIC,UNFIL.T.TOTAL	mg/kg	0	5.61	15.41	2	2	100.0	51	50	98.0	9.30	6.13	2.04	2.01	97.1
CDUT	CADMIUM,UNFIL.T.TOTAL	mg/kg	0	2.37	3.74	2	2	100.0	43	40	93.0	2.98	9.74	1.38	4.35	90.0
COUT	COBALT,UNFIL.T.TOTAL	mg/kg	0	14.66	1838.01	2	2	100.0	41	30	73.2	164.16	9.29	30.45	4.69	73.3
CRUT	CHROMIUM,UNFIL.T.TOTAL	mg/kg	0	164.49	218.05	2	2	100.0	51	50	98.0	189.38	301.43	1.22	3.68	97.1
CUUT	COPPER,UNFIL.T.TOTAL	mg/kg	0	451.13	473.52	2	2	100.0	46	46	100.0	462.19	606.31	1.03	1.72	100.0
HGUT	MERCURY,UNFIL.T.TOTAL	mg/kg	0	0.93	1.50	2	2	100.0	50	50	100.0	1.19	2.23	1.40	1.67	100.0
MOUT	MOLYBDENUM,UNFIL.T.TOTAL	mg/kg	0	5.26	5.26	1	1	100.0	37	23	62.2	5.26	5.80	0.00	2.88	64.3
NIUT	NICKEL,UNFIL.T.TOTAL	mg/kg	0	38.32	63.91	2	2	100.0	46	44	95.7	49.49	59.17	1.44	2.90	93.3
PBUT	LEAD,UNFIL.T.TOTAL	mg/kg	0	101.50	189.72	2	2	100.0	49	48	98.0	138.77	173.99	1.56	2.24	96.9
SEUT	SELENIUM,UNFIL.T.TOTAL	mg/kg	0	2.80	4.14	2	2	100.0	50	48	96.0	3.41	3.04	1.32	1.93	93.9
SRUT	STRONTIUM,UNFIL.T.TOTAL	mg/kg	0	139.10	215.26	2	2	100.0	51	51	100.0	173.04	231.70	1.36	1.97	100.0
ZNUT	ZINC,UNFIL.T.TOTAL	mg/kg	0	425.23	451.13	2	2	100.0	51	51	100.0	437.99	905.39	1.04	2.39	100.0
CCNPUR	CYANIDE-FREE,UNFIL.T.REAC.	mg/kg	0	0.26	0.26	2	1	50.0	40	3	7.5	0.09	0.02	4.52	2.74	10.0
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PMMCRE	M-CRESOL	ug/kg	1	421052.60	421052.60	2	1	50.0	51	42	82.3	44356.90	116847.30	24.11	12.16	85.3
PNNAPH	NAPHTHALENE	ug/kg	1	8834.60	8834.60	2	1	50.0	51	6	11.8	5246.20	3823.30	2.09	3.75	14.7
DIOXINS AND FURANS																
P8CDD	OCTACHLORODIBENZODIOXIN	ug/kg	1	4.90	4.90	2	1	50.0	50	25	50.0	8.70	8.50	2.27	3.60	58.8
P8CDF	OCTACHLORODIBENZOFURAN	ug/kg	1	31.20	31.20	2	1	50.0	50	4	8.0	7.70	5.40	7.23	3.48	11.8
PESTICIDES,HERBICIDES,PCBS																
P1BHCG	GAMMA-BHC(HEXCHLORCYCLOHEXANE)	ug/kg	2	15.00	37.40	2	2	100.0	51	28	54.9	23.70	8.90	1.91	2.69	67.7
P1CHLA	ALPHA-CHLORDANE	ug/kg	1	12.50	18.80	2	2	100.0	51	18	35.3	15.30	5.90	1.33	2.38	47.1
P1PCBT	PCB, TOTAL	ug/kg	2	121.50	127.80	2	2	100.0	51	40	78.4	124.60	88.70	1.04	3.18	79.4
P1PPDD	PP-DDD	ug/kg	1	22.60	31.20	2	2	100.0	51	13	25.5	26.60	5.10	1.26	2.48	35.3
P1PPDE	PP-DDE	ug/kg	1	7.50	9.30	2	2	100.0	51	22	43.1	8.40	7.30	1.16	2.31	52.9
X2HCB	HEXACHLOROBENZENE	ug/kg	2	6.20	15.00	2	2	100.0	51	17	33.3	9.60	5.60	1.87	2.65	38.2
P1ALDR	ALDRIN	ug/kg	1	43.60	43.60	2	1	50.0	51	6	11.8	12.90	4.60	5.61	2.50	17.7
P1BHCA	ALPHA-BHC(HEXCHLORCYCLOHEXANE)	ug/kg	1	15.60	15.60	2	1	50.0	51	12	23.5	7.70	5.50	2.71	2.74	35.3

PLANT NAME : London (Pottersburg)
PLANT TYPE : Secondary

SAMPLING TYPE : Raw Sludge
SAMPLE FORM : Dry Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS (DRY WEIGHT)	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
P1BHCB	BETA-BHC (HEXCHLORCYCLHEXANE)	ug/kg	1	87.20	87.20	2	1	50.0	51	18	35.3	18.20	7.40	9.17	3.29	38.2
P1CHLO	GAMMA-CHLORDANE	ug/kg	1	28.00	28.00	2	1	50.0	51	19	37.3	10.30	6.00	4.11	2.44	50.0
P1DIEL	DIELDRIN	ug/kg	2	18.70	18.70	2	1	50.0	51	20	39.2	8.40	7.20	3.09	3.10	50.0
P1DMDT	METHOXYCHLOR	ug/kg	1	124.60	124.60	2	1	50.0	51	19	37.3	48.40	45.80	3.81	5.15	44.1
P1ENDR	ENDRIN	ug/kg	3	37.40	37.40	2	1	50.0	51	8	15.7	11.90	4.20	5.04	2.21	23.5
P1PPDT	PP-DDT	ug/kg	3	30.10	30.10	2	1	50.0	51	6	11.8	19.40	16.40	1.86	2.27	17.7
P245T	2,4,5-TRICLORPHENOXYACETC ACID	ug/kg	3	158.90	158.90	2	1	50.0	51	21	41.2	54.70	48.90	4.52	3.49	47.1
P24D	2,4-DICHLOROPHENOXYACETIC ACID	ug/kg	3	1557.60	1557.60	2	1	50.0	51	38	74.5	108.10	93.20	43.52	6.50	82.3
P5SILV	SILVEX	ug/kg	3	202.50	202.50	2	1	50.0	51	23	45.1	61.70	47.30	5.37	3.40	55.9
X1HCCP	HEXACHLOROCYCLOPENTADIENE	ug/kg	3	90.30	90.30	2	1	50.0	51	2	3.9	58.30	35.30	1.86	2.18	5.9
X2124	1,2,4-TRICHLOROBENZENE	ug/kg	3	93.50	93.50	2	1	50.0	51	17	33.3	18.80	9.30	9.63	4.06	41.2
VOLATILE ORGANIC COMPOUNDS																
B2MPXY	M-, AND P-XYLENES	ug/kg	1	1931.50	1931.50	2	1	50.0	51	16	31.4	1205.10	1345.90	1.95	3.86	41.2

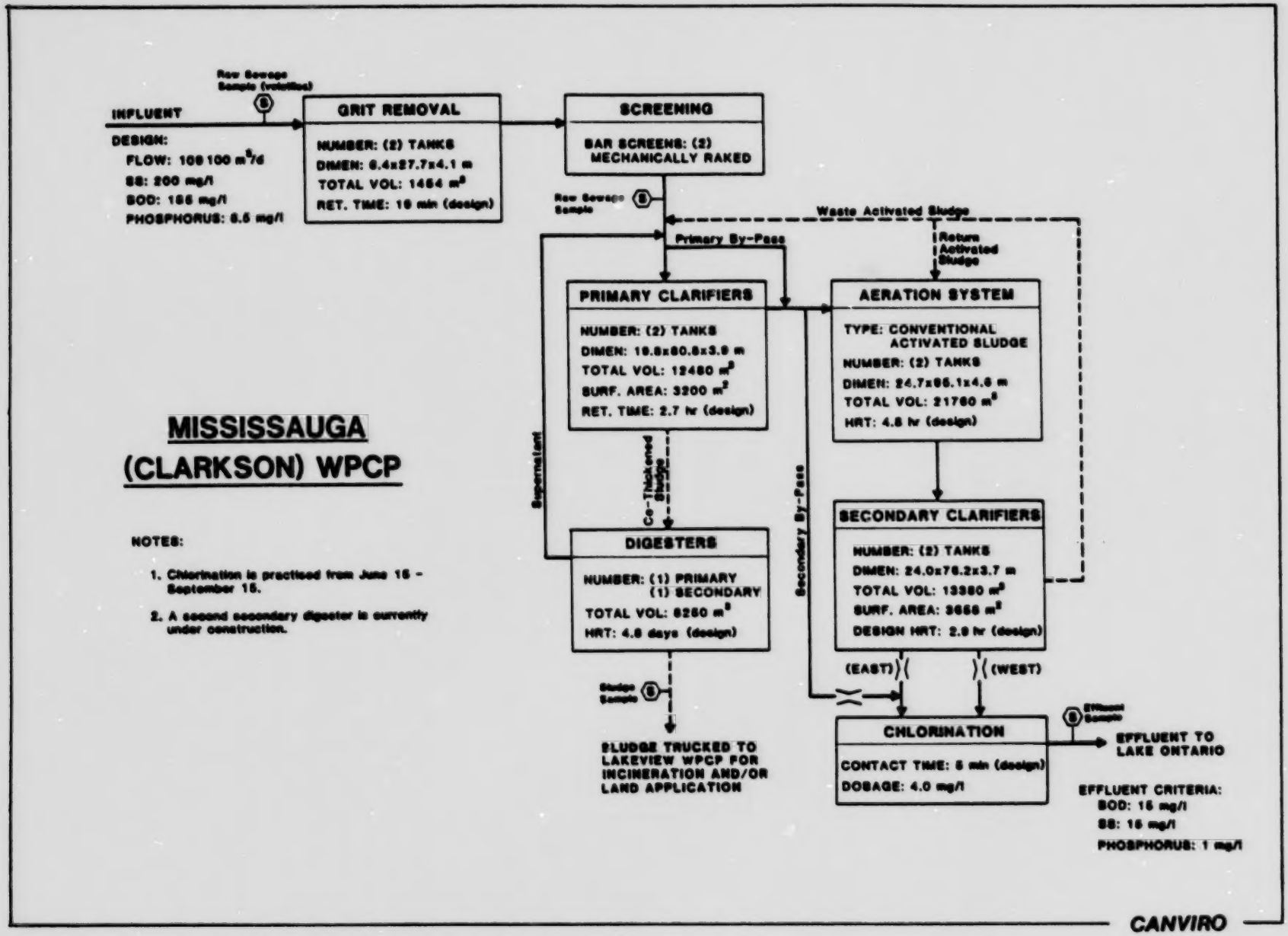
Sub-Appendix A-14

Mississauga (Clarkson)

Contents:

- Plant Schematic with Design Characteristics
- Annual Data Review (1981 - 1986 Plant Performance)
- Sources of Municipal Water Pollution Control Plant Raw Sewage
- Operational Evaluation for Mississauga (Clarkson)
- Analytical Data

(KIR18/28A)


Raw Sewage Sample (volatiles)
INFLUENT
DESIGN:
FLOW: 109 100 m³/d
SS: 200 mg/l
BOD: 155 mg/l
PHOSPHORUS: 6.5 mg/l
GRIT REMOVAL
NUMBER: (2) TANKS
DIMEN: 6.4x27.7x4.1 m
TOTAL VOL: 1464 m³
RET. TIME: 19 min (design)
SCREENING
BAR SCREENS: (2) MECHANICALLY RAKED
Raw Sewage Sample
Waste Activated Sludge
Primary By-Pass
Return Activated Sludge
PRIMARY CLARIFIERS
NUMBER: (2) TANKS
DIMEN: 19.8x80.8x3.9 m
TOTAL VOL: 12480 m³
SURF. AREA: 3200 m²
RET. TIME: 2.7 hr (design)
AERATION SYSTEM
TYPE: CONVENTIONAL ACTIVATED SLUDGE
NUMBER: (2) TANKS
DIMEN: 24.7x86.1x4.6 m
TOTAL VOL: 21760 m³
HRT: 4.8 hr (design)
Supernatant
Co-Thickened Sludge
Secondary By-Pass
SECONDARY CLARIFIERS
NUMBER: (2) TANKS
DIMEN: 24.0x76.2x3.7 m
TOTAL VOL: 13360 m³
SURF. AREA: 3656 m²
DESIGN HRT: 2.9 hr (design)
DIGESTERS
NUMBER: (1) PRIMARY (1) SECONDARY
TOTAL VOL: 6250 m³
HRT: 4.8 days (design)
(EAST)
(WEST)
Sludge Sample
SLUDGE TRUCKED TO LAKEVIEW WPCP FOR INCINERATION AND/OR LAND APPLICATION
Effluent Sample
CHLORINATION
CONTACT TIME: 8 min (design)
DOSAGE: 4.0 mg/l
EFFLUENT TO LAKE ONTARIO
EFFLUENT CRITERIA:
BOD: 15 mg/l
SS: 15 mg/l
PHOSPHORUS: 1 mg/l
MISSISSAUGA
(CLARKSON) WPCP
NOTES:
1. Chlorination is practised from June 15 - September 15.
2. A second secondary digester is currently under construction.
CANVIRO

CLARKSON WPCP SOUTH-PEEL SYSTEM
Conventional Activated Sludge
Phosphorus Removal - Continuous
Capacity - 189.184 10(3)m3/day

PARAMETER	1981	1982	1983	1984	1985	5 YEAR AVERAGE 81-85
Avg. Daily Flow (1000 m3/day)	48.89	59.22	67.85	75.29	71.20	64.17
BOD5 - Influent (mg/L)	326.60	280.66	187.00	169.42	161.58	225.07
BOD5 - Effluent (mg/L)	5.90	7.55	9.00	8.17	11.50	8.46
Annual BOD5 Significantly Different from Mean Annual Average BOD5?	Y	N	N	N	Y	
TSS - Influent (mg/L)	376.66	373.70	218.83	194.25	182.42	269.17
TSS - Effluent (mg/L)	10.75	8.71	8.67	8.17	9.50	9.16
Annual TSS Significantly Different from Mean Annual Average TSS?	Y	N	N	N	N	
Total P - Influent (mg/L)	7.50	9.96	9.05	7.91	8.03	8.65
Total P - Effluent (mg/L)	0.81	1.02	1.00	0.89	0.90	0.94
Annual TP Significantly Different from Mean						
Annual Average TP?	N	N	Y	N	N	
TP in Compliance?	Y	N	N	Y	Y	Y

I.D. - Insufficient Data

R

SOURCES OF MUNICIPAL WATER POLLUTION CONTROL PLANT RAW SEWAGE

GENERAL DESCRIPTION OF WATER POLLUTION CONTROL PLANT (WPCP)

NAME OF WPCP	CLARKSON	
WORKS NUMBER	110001328	
TREATMENT TYPE	PRIMARY	
	PHOSPHORUS REMOVAL	CONTINUOUS
DESIGN CAPACITY (1000 m3/d)	109.104	
1986 AVERAGE DAY FLOW (1000 m3/d)	75.548	
POPULATION SERVED	120000	

% OF TOTAL FLOW ATTRIBUTED TO:

INDUSTRIAL SOURCES (%)	25
COMMERCIAL SOURCES (%) (Population x 0.0757)	12
RESIDENTIAL SOURCES (%) (Population x 0.175)	28
UNACCOUNTED FOR, INCL. INFILTRATION (100-% Contributed from industrial, commercial and residential sources)	35

PROFILE OF INDUSTRIES IN CATCHMENT

TOTAL NO OF INDUSTRIES	NOT AVAILABLE
INDUSTRIES WITH WATER	
NO OF SIC CATEGORIES	

DESCRIPTION OF THE TOP 5 INDUSTRIES DISCHARGED TO THE WPCP (BASED ON WATER USE DATA)

DESCRIPTION	SIC	# OF COMPANIES

OPERATIONAL EVALUATION FOR: MISSISSAUGA (CLARKSON) WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: March 6, 1987
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: 109,100 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
RAW SEWAGE FLOW	59,400	61,810	62,210	61,840	62,660	69,260	64,730
% of Design Flow	54.45%	56.65%	57.02%	56.68%	57.43%	63.48%	59.33%
Influent BOD (mg/L)		150.0		144.0			
Primary BOD (mg/L)		122.0		150.0			
Secondary BOD (mg/L)	12.0	14.0	12.0	14.0			
% PRIMARY REMOVAL		18.7		-4.2			
% SECONDARY REMOVAL		90.7		90.3			
Influent SS (mg/L)		140.0		129.0			
Primary SS (mg/L)		94.0		89.0			
Secondary SS (mg/L)	6.0	10.0	8.0	8.0			
% PRIMARY REMOVAL		32.9		31.0			
% SECONDARY REMOVAL		92.9		93.8			
Influent NH4 (mg/L)							
Primary NH4 (mg/L)	25.0						
Secondary NH4 (mg/L)	3.0						
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)		8.00		7.20			
Primary Total P (mg/L)		6.10		5.20			
Secondary Total P (mg/L)	0.80	0.80	0.60	0.60			
% PRIMARY REMOVAL		23.8		27.8			
% SECONDARY REMOVAL		90.0		91.7			

OPERATIONAL EVALUATION FOR: MISSISSAUGA (CLARKSON) WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: March 6, 1987
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: 109,100 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 8	DAY 9	DAY 10	DAY 11	DAY 12	DAY 13	DAY 14
RAW SEWAGE FLOW	63,580	62,550	63,000	62,690	663,140	73,000	115,720
% of Design Flow	58.28%	57.33%	57.75%	57.46%	607.83%	66.91%	106.07%
Influent BOD (mg/L)		156.0					
Primary BOD (mg/L)		102.0		114.0			
Secondary BOD (mg/L)	8.0	20.0	5.0	14.0	15.0		
% PRIMARY REMOVAL		34.6					
% SECONDARY REMOVAL		87.2					
Influent SS (mg/L)		130.0					
Primary SS (mg/L)		95.0		63.0			
Secondary SS (mg/L)	8.0	10.0	6.0	6.0	10.0		
% PRIMARY REMOVAL		26.9					
% SECONDARY REMOVAL		92.3					
Influent NH4 (mg/L)							
Primary NH4 (mg/L)	2.1						
Secondary NH4 (mg/L)	2.0						
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)		6.80		5.60			
Primary Total P (mg/L)		4.80		4.30			
Secondary Total P (mg/L)	0.60	0.60	0.70	0.60	0.70		
% PRIMARY REMOVAL		29.4		23.2			
% SECONDARY REMOVAL		91.2		89.3			

OPERATIONAL EVALUATION FOR: MISSISSAUGA (CLARKSON) WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: March 6, 1987
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: 109,100 m3/d

PARAMETER	SAMPLING PERIOD DAY 15	DAY 16	DAY 17	DAY 18	DAY 19	DAY 20	DAY 21
RAW SEWAGE FLOW	85,160	72,190	69,330	69,160	72,900		
% of Design Flow	78.06%	66.17%	63.55%	63.39%	66.82%		
Influent BOD (mg/L)		189.0		84.0			
Primary BOD (mg/L)		72.0		84.0			
Secondary BOD (mg/L)	9.0	12.0	11.0	12.0	12.0		
% PRIMARY REMOVAL		61.9		0.0			
% SECONDARY REMOVAL		93.7		85.7			
Influent SS (mg/L)		175.0		125.0			
Primary SS (mg/L)		87.0		88.0			
Secondary SS (mg/L)	4.0	6.0	7.0	4.0	6.0		
% PRIMARY REMOVAL		50.3		29.6			
% SECONDARY REMOVAL		96.6		96.8			
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)		6.80		4.80			
Primary Total P (mg/L)		5.20		4.40			
Secondary Total P (mg/L)	0.85	0.90	0.80	0.60	0.68		
% PRIMARY REMOVAL		23.5		8.3			
% SECONDARY REMOVAL		86.8		87.5			

OPERATIONAL EVALUATION FOR: MISSISSAUGA (CLARKSON) WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: June 26, 1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 109,100 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
RAW SEWAGE FLOW	76,200	73,270	74,820	75,650	78,710	76,220	75,710
% of Design Flow	69.84%	67.16%	68.58%	69.34%	72.14%	69.86%	69.40%
Influent BOD (mg/L)				99.0			
Primary BOD (mg/L)			96.0	81.0	90.0		
Secondary BOD (mg/L)	8.0	11.0	10.0	7.0	11.0		
% PRIMARY REMOVAL				18.2			
% SECONDARY REMOVAL				92.9			
Influent SS (mg/L)				122.0			
Primary SS (mg/L)			146.0	75.0	80.0		
Secondary SS (mg/L)	7.0	8.0	11.0	9.0	11.0		
% PRIMARY REMOVAL				38.5			
% SECONDARY REMOVAL				92.6			
Influent NH4 (mg/L)							
Primary NH4 (mg/L)	21.0						
Secondary NH4 (mg/L)	6.0						
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)				6.80			
Primary Total P (mg/L)			7.20	5.00	6.00		
Secondary Total P (mg/L)	1.10	0.90	0.80	1.00	1.00		
% PRIMARY REMOVAL				26.5			
% SECONDARY REMOVAL				85.3			

OPERATIONAL EVALUATION FOR: MISSISSAUGA (CLARKSON) WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: June 26, 1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 109,100 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 8	DAY 9	DAY 10	DAY 11	DAY 12	DAY 13	DAY 14
RAW SEWAGE FLOW	78,160	76,930	75,850	77,450	76,030	72,560	73,930
% of Design Flow	71.64%	70.51%	69.52%	70.99%	69.69%	66.51%	67.76%
Influent BOD (mg/L)				120.0			
Primary BOD (mg/L)				81.0	96.0		
Secondary BOD (mg/L)				15.0	17.0		
% PRIMARY REMOVAL				32.5			
% SECONDARY REMOVAL				87.5			
Influent SS (mg/L)				208.0			
Primary SS (mg/L)				90.0	85.0		
Secondary SS (mg/L)			8.0	10.0	14.0		
% PRIMARY REMOVAL				56.7			
% SECONDARY REMOVAL				95.2			
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)			17.0				
Secondary TKN (mg/L)			4.0				
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)				7.20			
Primary Total P (mg/L)				4.80	4.60		
Secondary Total P (mg/L)			0.90	0.80	1.60		
% PRIMARY REMOVAL				33.3			
% SECONDARY REMOVAL				88.9			

OPERATIONAL EVALUATION FOR: MISSISSAUGA (CLARKSON) WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: June 26, 1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 109,100 m3/d

PARAMETER	SAMPLING PERIOD DAY 15	DAY 16	DAY 17	DAY 18	DAY 19	DAY 20	DAY 21
RAW SEWAGE FLOW	120,360	92,790	83,860	82,790	82,000	76,050	70,000
% of Design Flow	110.32%	85.05%	76.87%	75.88%	75.16%	69.71%	64.16%
Influent BOD (mg/L)		141.0		90.0			
Primary BOD (mg/L)							
Secondary BOD (mg/L)	17.0	18.0	21.0	13.0	13.0		
% PRIMARY REMOVAL							
% SECONDARY REMOVAL		87.2		85.6			
Influent SS (mg/L)		125.0		188.0			
Primary SS (mg/L)							
Secondary SS (mg/L)	12.0	12.0	30.0	12.0	12.0		
% PRIMARY REMOVAL							
% SECONDARY REMOVAL		90.4		93.6			
Influent NH4 (mg/L)							
Primary NH4 (mg/L)	18.0						
Secondary NH4 (mg/L)	7.0						
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)		7.60		6.40			
Primary Total P (mg/L)							
Secondary Total P (mg/L)	0.90	1.00	1.00	0.70	0.90		
% PRIMARY REMOVAL				100.0			
% SECONDARY REMOVAL				89.1			

PLANT NAME : Mississauga (Clarkson)
PLANT TYPE : Secondary

SAMPLING TYPE : Raw Sewage
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	PLANT MIN. CONC. > x DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0	112.00	308.00	12	12	100.0	267	266	99.6	170.96	140.23	1.38	1.93	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0	208.00	1110.00	10	10	100.0	260	258	99.2	367.69	287.75	1.64	1.82	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0	4.50	65.00	12	12	100.0	271	271	100.0	25.86	22.39	1.91	1.81	100.0
NNHTPR	AMMONIUM,TOTAL FILT.REAC.	mg/L	0	13.10	21.60	12	12	100.0	273	273	100.0	28.62	25.44	1.43	1.47	100.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0	17.00	76.50	12	12	100.0	275	275	100.0	6.70	6.90	1.04	1.05	100.0
PH	(-LOG(H+(CONCN))		0	6.11	6.97	12	12	100.0	275	275	100.0	7.93	5.18	1.45	1.51	100.0
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/L	0	5.03	17.90	13	13	100.0	248	248	100.0	7.93	5.18	1.45	1.51	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0	79.80	482.00	12	12	100.0	267	266	99.6	192.63	126.88	2.05	1.93	100.0
RSPLOI	RESIDUE,PAR.LOSS ON IGNI.	mg/L	0	56.20	191.00	7	7	100.0	90	89	98.9	80.10	100.84	1.52	1.78	100.0
NNO2PR	NITRITE,FILT. REACT.	mg/L	0	0.03	0.04	12	8	66.7	271	58	21.4	0.01	0.01	3.60	2.98	51.4
PHNOL	PHENOLICS (4AAP)	mg/L	0	0.60	0.75	12	2	16.7	275	37	13.5	0.29	0.31	1.47	2.05	37.8
NNOTPR	NITRATES,TOTAL FILT.REAC.	mg/L	0	0.25	0.25	12	1	8.3	275	28	10.2	0.06	0.05	1.88	2.33	32.4
METALS																
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	670.00	4600.00	14	14	100.0	322	306	95.0	1570.00	1000.10	1.98	2.65	97.3
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	20.00	230.00	14	14	100.0	322	237	73.6	60.00	51.10	2.07	3.44	89.2
CUUT	COPPER,UNFILT.TOTAL	ug/L	0	120.00	130.00	2	2	100.0	49	48	98.0	120.00	110.60	1.06	2.28	97.1
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	0.14	0.79	12	12	100.0	283	274	96.8	0.40	0.23	1.70	2.11	100.0
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	390.00	670.00	14	14	100.0	319	318	99.7	470.00	370.70	1.15	2.14	100.0
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	120.00	1000.00	14	14	100.0	322	315	97.8	310.00	211.00	1.73	2.94	100.0
PBUT	LEAD,UNFILT.TOTAL	ug/L	0	90.00	570.00	14	7	50.0	322	57	17.7	90.00	59.50	2.74	1.86	51.4
CDUT	CADMIUM,UNFILT.TOTAL	ug/L	0	10.00	20.00	14	6	42.9	322	76	23.6	10.00	6.50	2.11	2.09	70.3
NIUT	NICKEL,UNFILT.TOTAL	ug/L	0	20.00	50.00	14	5	35.7	322	105	32.0	20.00	38.80	1.65	2.70	54.1
MOUT	MOLYBDENUM,UNFILT.TOTAL	ug/L	0	20.00	30.00	14	4	28.6	321	41	12.8	10.00	12.40	1.54	1.72	56.8
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PMPHEN	PHENOL	ug/L	2	25.80	91.50	12	7	58.3	275	118	42.9	18.76	14.52	2.40	2.46	78.4
PMBBP	BUTYLBENZYLPHTHALATE	ug/L	1	10.70	21.00	12	6	50.0	275	34	12.4	8.64	5.85	1.83	1.66	37.8
PMMCRS	M-CRESOL	ug/L	1	29.20	90.70	12	6	50.0	275	167	60.7	20.87	25.59	3.01	3.45	86.5
PNNAPH	NAPHTHALENE	ug/L	1	11.50	22.70	12	3	25.0	275	16	5.8	6.62	5.37	1.70	1.47	21.6
DIOXINS AND FURANS																
PHCDD	OCTACHLORODIBENZODIOXIN	ng/L	1	0.73	0.73	2	1	50.0	54	4	7.4	1.21	0.87	2.04	3.66	10.8
PESTICIDES,HERBICIDES,PCBS																
P24D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	0.22	1.00	12	8	66.7	276	214	77.5	0.16	0.13	4.93	3.72	100.0
P1BHCG	GAMMA-BHC(HEXCHLORCYCLHEXANE)	ug/L	2	0.02	0.07	12	6	50.0	276	143	51.8	0.02	0.02	2.02	2.29	94.6
P1BHCB	BETA-BHC (HEXCHLORCYCLHEXANE)	ug/L	1	0.03	0.13	12	5	41.7	276	32	11.6	0.02	0.01	2.54	1.66	35.1
P1DMDT	METHOXYCHLOR	ug/L	1	0.15	3.90	12	3	25.0	276	47	17.0	0.09	0.08	3.62	3.14	43.2
P3SILV	SILVEX	ug/L	3	0.19	0.40	12	3	25.0	276	28	10.1	0.08	0.06	2.27	1.68	40.5
P1CHLA	ALPHA-CHLORDANE	ug/L	1	0.02	0.03	12	2	16.7	276	7	2.5	0.01	0.01	1.43	1.46	13.5
P1BHCA	ALPHA-BHC(HEXCHLORCYCLHEXANE)	ug/L	1	0.02	0.02	12	1	8.3	276	16	5.8	0.01	0.01	1.22	1.50	18.9
P1DIEL	DIELDRIN	ug/L	2	0.02	0.02	12	1	8.3	276	8	2.9	0.01	0.01	1.22	1.28	18.9
P1ENDR	ENDRIN	ug/L	3	0.03	0.03	12	1	8.3	276	5	1.8	0.01	0.01	1.37	1.34	10.8

PLANT NAME : Mississauga (Clarkson)
PLANT TYPE : Secondary

SAMPLING TYPE : Raw Sewage
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	PLANT MIN. CONC. > MDL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
PESTICIDES,HERBICIDES,PCBS																
P1PCBT	PCB, TOTAL	ug/L	2	0.38	0.38	12	1	8.3	276	42	15.2	0.05	0.06	1.92	2.31	46.0
X2124	1,2,4-TRICHLOROBENZENE	ug/L	3	0.23	0.23	12	1	8.3	276	35	12.7	0.01	0.01	2.47	2.48	40.5
X2HCE	HEXACHLOROETHANE	ug/L	3	0.03	0.03	12	1	8.3	276	5	1.8	0.01	0.01	1.37	1.26	13.5
VOLATILES ORGANIC COMPOUNDS																
B2MPXY	M-, AND P-XYLENES	ug/L	1	47.00	260.00	12	6	50.0	274	43	15.7	41.68	26.00	2.47	2.02	37.8
B2EBNZ	ETHYLBENZENE	ug/L	1	41.00	160.00	12	4	33.3	274	30	11.0	29.80	23.50	1.95	1.75	29.7
X1CHLO	CHLOROFORM	ug/L	1	91.00	110.00	12	3	25.0	274	28	10.2	29.83	23.90	2.06	1.75	32.4
B2OXYL	O-XYLENE	ug/L	1	60.00	150.00	12	2	16.7	274	25	9.1	25.92	22.47	1.89	1.56	24.3
X1DCLE	1,1-DICHLOROETHENE	ug/L	1	10.00	14.00	12	2	16.7	274	7	2.6	18.32	20.55	1.24	1.28	13.5
X1BDCM	BROMODICHLOROMETHANE	ug/L	1	130.00	130.00	12	1	8.3	274	2	0.7	33.90	30.10	1.53	1.10	5.4
X1TETR	TETRACHLOROETHYLENE	ug/L	1	150.00	150.00	12	1	8.3	274	12	4.4	23.66	21.51	1.79	1.53	18.9

PLANT NAME : Mississauga (Clarkson)
PLANT TYPE : Secondary

SAMPLING TYPE : Final Effluent
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	STD. FOR SURFACE-WATER	STD. REF.	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET.	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																		
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0		-	10.10	33.10	12	12	100.0	213	211	99.1	19.64	21.22	1.43	2.07	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0		-	20.00	54.00	12	12	100.0	213	211	99.1	42.26	52.80	1.33	1.83	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0		-	5.60	8.80	12	12	100.0	220	220	100.0	7.14	8.09	1.14	1.60	100.0
NNO2PR	NITRITE,FILT. REACT.	mg/L	0		-	0.28	2.10	12	12	100.0	220	194	88.2	1.07	0.22	1.70	5.95	96.4
NNOTPR	NITRATES,TOTAL FILT.REAC.	mg/L	0		-	4.30	17.30	12	12	100.0	224	186	83.0	8.54	2.33	1.55	7.75	96.4
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0		-	1.90	15.70	12	12	100.0	222	222	100.0	5.20	7.97	2.17	2.71	100.0
PH	(-LOG(H+(CONCN))		0		-	6.49	7.31	12	12	100.0	224	224	100.0	6.88	7.10	1.03	1.05	100.0
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/L	0		-	0.31	1.37	13	13	100.0	211	206	97.6	0.62	0.68	1.57	1.97	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0		-	5.80	21.40	12	12	100.0	220	219	99.6	11.00	10.12	1.48	2.00	100.0
RSPLOI	RESIDUE,PARTICULATE LOSS ON IGNI	mg/L	0		-	6.80	17.30	7	7	100.0	77	58	75.3	9.28	7.47	1.36	2.71	93.3
NNHTPR	AMMONIUM,TOTAL FILT.REAC.	mg/L	0		-	0.30	11.90	12	11	91.7	223	204	91.5	2.08	3.90	4.89	6.98	100.0
PHNOL	PHENOLICS (4AAP)	mg/L	0	0.00	ONT-MOE	0.25	0.44	12	4	33.3	225	33	14.7	0.09	0.07	2.51	1.86	53.6
METALS																		
CUUT	COPPER,UNFILT.TOTAL	ug/L	0	5.00	ONT-MOE	10.00	10.00	2	2	100.0	47	30	63.8	10.00	13.10	1.14	2.56	77.8
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	0.20	ONT-MOE	0.03	0.06	12	12	100.0	233	220	94.4	0.05	0.03	1.29	2.62	100.0
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	3750.00	ONT-MOE	320.00	520.00	14	14	100.0	267	267	100.0	390.00	340.90	1.13	2.14	100.0
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	30.00	ONT-MOE	50.00	110.00	14	14	100.0	267	262	98.1	80.00	53.30	1.26	2.48	100.0
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	75.00	ONT-MOE	60.00	100.00	14	9	64.3	264	196	74.2	60.00	101.70	1.74	3.72	96.4
NIUT	NICKEL,UNFILT.TOTAL	ug/L	0	25.00	ONT-MOE	10.00	40.00	14	8	57.1	267	171	64.0	10.00	22.10	2.33	3.60	85.7
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	100.00	ONT-MOE	10.00	20.00	14	6	42.9	267	137	51.3	10.00	9.00	1.59	2.00	89.3
CDUT	CADMIUM,UNFILT.TOTAL	ug/L	0	0.20	ONT-MOE	0.00	10.00	14	5	35.7	267	65	24.3	0.00	2.10	1.91	2.07	71.4
MOUT	MOLYBDENUM,UNFILT.TOTAL	ug/L	0		-	10.00	10.00	14	1	7.1	267	75	28.1	10.00	6.60	1.29	1.54	67.9
PBUT	LEAD,UNFILT.TOTAL	ug/L	0	25.00	ONT-MOE	30.00	30.00	14	1	7.1	267	25	9.4	20.00	16.50	1.47	1.48	60.7
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																		
PNONTB	NITROBENZENE	ug/L	1	10.00	ONT-MOE	5.70	5.70	12	1	8.3	228	4	1.8	1.16	1.09	1.65	1.54	14.3
DIOXINS AND FURANS																		
P96CDD	OCTACHLORODIBENZODIOXIN	ng/L	1	150.00	ONT-MOE	0.20	0.20	2	1	50.0	44	4	9.1	0.45	0.31	3.12	3.43	14.3
PESTICIDES,HERBICIDES,PCBS																		
P1BHCG	GAMMA-BHC(HEXCHLORCYCLHEXANE)	ug/L	2	0.06	ONT-MOE	0.01	0.03	12	12	100.0	227	157	69.2	0.02	0.02	1.49	2.48	96.4
P324D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	4.00	ONT-MOE	0.13	0.79	12	10	83.3	227	177	78.0	0.16	0.08	4.24	4.71	100.0
X2124	1,2,4-TRICHLOROBENZENE	ug/L	3	0.50	ONT-MOE	0.03	0.36	12	3	25.0	227	36	15.9	0.01	0.01	3.79	2.44	32.1
P35ILV	SILVEX	ug/L	3		-	0.06	0.06	12	1	8.3	227	23	10.1	0.03	0.03	1.29	1.83	50.0
X2HCE	HEXACHLOROETHANE	ug/L	3		-	0.05	0.05	12	1	8.3	227	5	2.2	0.01	0.01	1.94	1.23	14.3
VOLATILES ORGANIC COMPOUNDS																		
X112CE	1,2-DICHLOROETHANE	ug/L	1	0.80	NYS-STD	9.30	9.40	11	2	18.2	224	4	1.8	1.50	1.03	2.47	1.30	10.7
X1CHLO	CHLOROFORM	ug/L	1	0.20	NYS-STD	3.40	4.50	11	2	18.2	224	37	16.5	1.28	1.37	1.74	2.18	64.3
B2BDCL	BROMODICHLOROBENZENE	ug/L	1		-	10.00	10.00	11	1	9.1	224	3	1.3	5.33	4.93	1.23	1.21	7.1

PLANT NAME : Mississauga (Clarkson) **SAMPLING TYPE : Raw Sludge**
PLANT TYPE : Secondary **SAMPLE FORM : Dry Weight**

CONTAM-INANT	CONTAMINANT NAME	UNITS (DRY WEIGHT)	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
COD	CHEMICAL OXYGEN DEMAND	mg/kg	0	361464.97	946991.40	2	2	100.0	45	45	100.0	585067.70	892221.45	1.98	3.19	100.0
NNHTPR	AMMONIUM,TOTAL FILT.REAC.	mg/kg	0	11926.75	11926.75	1	1	100.0	48	47	97.9	11926.75	5911.32	0.00	4.59	100.0
NNOTPR	NITRATES,TOTAL FILT.REAC.	mg/kg	0	28.66	28.66	1	1	100.0	48	43	89.6	28.66	25.44	0.00	2.21	93.9
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/kg	0	25787.97	39808.92	2	2	100.0	51	51	100.0	32040.46	36897.85	1.36	2.98	100.0
PH	(-LOG(H+(CONC)))	mg/kg	0	5.65	5.65	1	1	100.0	49	49	100.0	5.65	6.03	0.00	1.10	100.0
PHNOL	PHENOLICS (4AAP)	mg/kg	0	89.17	89.17	1	1	100.0	50	41	82.0	89.17	82.34	0.00	3.54	85.3
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/kg	0	25931.23	39490.45	2	2	100.0	42	42	100.0	32000.56	20347.70	1.35	4.43	100.0
RST	RESIDUE, TOTAL	mg/kg	0	62800.00	69800.00	2	2	100.0	51	51	100.0	66207.55	32783.51	1.08	1.81	100.0
RSTLOI	RESIDUE,TOT.LOSS ON IGNI.	mg/kg	0	36700.00	38200.00	2	2	100.0	51	51	100.0	37442.49	20803.05	1.03	1.77	100.0
METALS																
AGUT	SILVER,UNFILT.TOTAL	mg/kg	0	19.75	20.06	2	2	100.0	45	40	88.9	19.90	30.17	1.01	2.61	84.4
ALUT	ALUMINUM,UNFILT.TOTAL	mg/kg	0	6400.32	8309.46	2	2	100.0	51	51	100.0	7292.68	9835.74	1.20	2.51	100.0
ASUT	ARSENIC,UNFILT.TOTAL	mg/kg	0	5.57	14.33	2	2	100.0	51	50	98.0	8.94	6.13	1.95	2.01	97.1
CDUT	CADMIUM,UNFILT.TOTAL	mg/kg	0	17.52	42.98	2	2	100.0	43	40	93.0	27.44	9.74	1.89	4.35	90.0
COUT	COBALT,UNFILT.TOTAL	mg/kg	0	19.75	44.41	2	2	100.0	41	30	73.2	29.61	9.29	1.77	4.69	73.3
CRUT	CHROMIUM,UNFILT.TOTAL	mg/kg	0	299.84	415.47	2	2	100.0	51	50	98.0	352.95	301.43	1.26	3.68	97.1
CUUT	COPPER,UNFILT.TOTAL	mg/kg	0	514.01	673.35	2	2	100.0	46	46	100.0	588.31	606.31	1.21	1.72	100.0
HGUT	MERCURY,UNFILT.TOTAL	mg/kg	0	3.34	4.73	2	2	100.0	50	50	100.0	3.98	2.23	1.28	1.67	100.0
MOUT	MOLYBDENUM,UNFILT.TOTAL	mg/kg	0	13.47	13.47	1	1	100.0	37	23	62.2	13.47	5.80	0.00	2.88	64.3
NIUT	NICKEL,UNFILT.TOTAL	mg/kg	0	38.69	134.67	2	2	100.0	46	44	95.7	72.19	59.17	2.42	2.90	93.3
PBUT	LEAD,UNFILT.TOTAL	mg/kg	0	511.78	659.03	2	2	100.0	49	48	98.0	580.76	173.99	1.20	2.24	96.9
SEUT	SELENIUM,UNFILT.TOTAL	mg/kg	0	1.91	3.44	2	2	100.0	50	48	96.0	2.56	3.04	1.52	1.93	93.9
SRUT	STRONTIUM,UNFILT.TOTAL	mg/kg	0	272.21	410.51	2	2	100.0	51	51	100.0	334.28	231.70	1.34	1.97	100.0
ZNUT	ZINC,UNFILT.TOTAL	mg/kg	0	823.41	1088.83	2	2	100.0	51	51	100.0	946.86	905.39	1.22	2.39	100.0
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PNNAPH	NAPHTHALENE	ug/kg	1	3409.20	14326.60	2	2	100.0	51	6	11.8	6988.70	3823.30	2.76	3.75	14.7
PMMCRE	M-CRESOL	ug/kg	1	583094.60	583094.60	2	1	50.0	51	42	82.3	37319.20	116847.30	48.79	12.16	85.3
PMNND	N-NITROSO-DI-PHENYLAMINE	ug/kg	1	8530.30	8530.30	2	1	50.0	51	1	2.0	3495.90	2972.50	3.53	1.81	2.9
DIOXINS AND FURANS																
P98CDD	OCTACHLORODIBENZODIOXIN	ug/kg	1	18.60	18.60	2	1	50.0	50	25	50.0	24.30	8.50	1.46	3.60	58.8
PESTICIDES,HERBICIDES,PCBS																
P1PCBT	PCB, TOTAL	ug/kg	2	57.30	134.70	2	2	100.0	51	40	78.4	87.90	88.70	1.83	3.18	79.4
P324D	2,4-DICHLOROPHENOXYACETIC ACID	ug/kg	3	15.30	84.50	2	2	100.0	51	38	74.5	36.00	93.20	3.35	6.50	82.3
P1ALDR	ALDRIN	ug/kg	1	4.30	4.30	2	1	50.0	51	6	11.8	8.30	4.60	2.52	2.50	17.7
P1BHCB	BETA-BHC (HEXCHLORCYCLOHEXANE)	ug/kg	1	63.70	63.70	2	1	50.0	51	18	35.3	9.40	7.40	14.87	3.29	38.2
P1BHCG	GAMMA-BHC(HEXCHLORCYCLOHEXANE)	ug/kg	2	7.20	7.20	2	1	50.0	51	28	54.9	10.70	8.90	1.75	2.69	67.7
P1CHLA	ALPHA-CHLORDANE	ug/kg	1	17.20	17.20	2	1	50.0	51	18	35.3	16.50	5.90	1.06	2.38	47.1
P1CHLG	GAMMA-CHLORDANE	ug/kg	1	2.90	2.90	2	1	50.0	51	19	37.3	6.80	6.00	3.33	2.44	50.0
P1DMDT	METHOXYCHLOR	ug/kg	1	207.00	207.00	2	1	50.0	51	19	37.3	38.60	45.80	10.75	5.15	44.1
P1OCHL	OXYCHLORDANE	ug/kg	2	5.70	5.70	2	1	50.0	51	8	15.7	9.50	4.50	2.07	2.27	20.6

PLANT NAME : Mississauga (Clarkson) **SAMPLING TYPE : Raw Sludge**
PLANT TYPE : Secondary **SAMPLE FORM : Dry Weight**

CONTAM-INANT	CONTAMINANT NAME	UNITS (DRY WEIGHT)	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
P1PDD	PP-DDD	ug/kg	1	4.30	4.30	2	1	50.0	51	13	25.5	8.30	5.10	2.52	2.48	35.3
P1PDE	PP-DDE	ug/kg	1	10.00	10.00	2	1	50.0	51	22	43.1	12.60	7.30	1.39	2.31	52.9
P245T	2,4,5-TRICLORPHENOXYACETIC ACID	ug/kg	3	84.50	84.50	2	1	50.0	51	21	41.2	26.00	48.90	5.30	3.49	47.1
X2124	1,2,4-TRICHLOROBENZENE	ug/kg	3	18.60	18.60	2	1	50.0	51	17	33.3	17.20	9.30	1.12	4.08	41.2
X2HCB	HEXACHLOROBENZENE	ug/kg	2	21.50	21.50	2	1	50.0	51	17	33.3	18.50	5.60	1.24	2.65	38.2
VOLATILE ORGANIC COMPOUNDS																
B2EBNZ	ETHYLBENZENE (C8H10)	ug/kg	1	13216.60	13216.60	2	1	50.0	51	10	19.6	1945.90	890.70	15.02	2.60	26.5
B2MPXY	M-, AND P-XYLENES	ug/kg	1	23885.40	23885.40	2	1	50.0	51	16	31.4	2615.90	1345.90	22.82	3.86	41.2
B2OXYL	O-XYLENE (C8H10)	ug/kg	1	14172.00	14172.00	2	1	50.0	51	8	15.7	2015.00	841.60	15.78	2.51	23.5
X1CHLO	CHLOROFORM (CHCL3)	ug/kg	1	5573.20	5573.20	2	1	50.0	51	12	23.5	1263.60	1225.10	8.16	4.24	35.3

PLANT NAME : Mississauga (Clarkson)
PLANT TYPE : Secondary

SAMPLING TYPE : Treated Sludge
SAMPLE FORM : Dry Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS (DRY WEIGHT)	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
COD	CHEMICAL OXYGEN DEMAND	mg/kg	0	861924.69	1356902.36	2	2	100.0	36	36	100.0	1081456.26	508097.94	1.38	4.65	100.0
NNITPR	AMMONIUM,TOTAL FIL.T.REAC.	mg/kg	0	46127.95	46127.95	1	1	100.0	25	25	100.0	46127.95	17658.28	0.00	2.92	100.0
NNOTPR	NITRATES,TOTAL FIL.T.REAC.	mg/kg	0	77.44	77.44	1	1	100.0	26	23	88.5	77.44	42.68	0.00	2.29	95.0
NNTKUR	NITROGEN-TOT-KJEL,UNP.TOT	mg/kg	0	49790.80	75084.18	2	2	100.0	49	49	100.0	61143.28	38494.12	1.34	1.77	100.0
PH	(-LOG(H+(CONCN))	mg/kg	0	9.84	9.84	1	1	100.0	47	47	100.0	9.84	7.17	0.00	1.09	100.0
PHENOL	PHENOLICS (4AAP)	mg/kg	0	27.20	134.68	2	2	100.0	49	41	83.7	60.52	43.05	3.10	3.14	87.9
PPUT	PHOSPHORUS,UNFIL.T.TOTAL.	mg/kg	0	31171.55	46127.95	2	2	100.0	43	43	100.0	37919.38	76638.67	1.32	6.91	100.0
RST	RESIDUE, TOTAL.	mg/kg	0	29700.00	47800.00	2	2	100.0	50	50	100.0	37678.38	80434.04	1.40	3.23	100.0
RSTLOI	RESIDUE,TOT.LOSS ON IGNI.	mg/kg	0	16100.00	25200.00	2	2	100.0	50	50	100.0	20142.49	43379.33	1.37	3.19	100.0
METALS																
AGUT	SILVER,UNFIL.T.TOTAL.	mg/kg	0	20.92	20.92	1	1	100.0	44	44	100.0	20.92	37.78	0.00	2.53	100.0
ALUT	ALUMINUM,UNFIL.T.TOTAL.	mg/kg	0	6903.77	10472.73	2	2	100.0	50	50	100.0	8503.01	10715.94	1.34	2.82	100.0
ASUT	ARSENIC,UNFIL.T.TOTAL.	mg/kg	0	9.21	12.46	2	2	100.0	50	49	98.0	10.71	5.40	1.24	2.06	97.1
CDUT	CADMIUM,UNFIL.T.TOTAL.	mg/kg	0	40.74	69.04	2	2	100.0	45	41	91.1	53.03	10.47	1.45	3.98	90.3
COUT	COBALT,UNFIL.T.TOTAL.	mg/kg	0	20.50	31.31	2	2	100.0	39	32	82.1	25.34	9.14	1.35	2.75	85.7
CRUT	CHROMIUM,UNFIL.T.TOTAL.	mg/kg	0	397.49	519.87	2	2	100.0	50	50	100.0	454.58	333.06	1.21	3.59	100.0
CUUT	COPPER,UNFIL.T.TOTAL.	mg/kg	0	669.46	897.31	2	2	100.0	45	45	100.0	775.05	732.24	1.23	2.16	100.0
HGUT	MERCURY,UNFIL.T.TOTAL.	mg/kg	0	4.71	8.16	2	2	100.0	50	49	98.0	6.20	3.24	1.47	2.04	97.1
MOUT	MOLYBDENUM,UNFIL.T.TOTAL.	mg/kg	0	2.93	2.93	1	1	100.0	34	23	67.7	2.93	6.41	0.00	2.84	69.2
NIUT	NICKEL,UNFIL.T.TOTAL.	mg/kg	0	50.17	115.06	2	2	100.0	45	42	93.3	75.98	72.95	1.80	2.95	90.0
PBUT	LEAD,UNFIL.T.TOTAL.	mg/kg	0	711.30	904.38	2	2	100.0	50	49	98.0	802.05	196.62	1.19	2.46	97.1
SEUT	SELENIUM,UNFIL.T.TOTAL.	mg/kg	0	3.35	3.70	2	2	100.0	50	48	96.0	3.52	2.67	1.07	2.98	97.1
SRUT	STRONTIUM,UNFIL.T.TOTAL.	mg/kg	0	313.81	576.77	2	2	100.0	50	50	100.0	425.43	240.93	1.54	2.54	100.0
ZNUT	ZINC,UNFIL.T.TOTAL.	mg/kg	0	941.42	1185.52	2	2	100.0	50	50	100.0	1056.45	988.90	1.18	2.57	100.0
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PMBBP	BUTYLBENZYLPHTHALATE	ug/kg	1	1673.60	37037.00	2	2	100.0	50	8	16.0	7873.10	1916.90	8.93	5.23	17.7
PNNAPH	NAPHTHALENE	ug/kg	1	21744.10	25585.80	2	2	100.0	50	6	12.0	23586.90	1545.60	1.12	3.77	14.7
PMDPE	DIPHENYL ETHER	ug/kg	1	15083.70	15083.70	2	1	50.0	50	2	4.0	11268.00	3222.10	1.51	3.37	5.9
PMNITB	NITROBENZENE	ug/kg	1	9171.70	9171.70	2	1	50.0	50	3	6.0	4380.40	1405.80	2.84	3.46	8.8
PMNND	N-NITROSO-DI-PHENYLAMINE	ug/kg	1	12471.40	12471.40	2	1	50.0	50	1	2.0	5108.00	1276.20	3.53	3.35	2.9
PNBIPH	BIPHENYL	ug/kg	1	6255.20	6255.20	2	1	50.0	50	1	2.0	5620.70	1890.80	1.16	3.26	2.9
PNFLUO	FLUORENE	ug/kg	1	2991.60	2991.60	2	1	50.0	50	3	6.0	3173.80	1352.10	1.09	3.25	8.8
PNPHEN	PHENANTHRENE	ug/kg	1	7963.00	7963.00	2	1	50.0	50	12	24.0	4081.60	2220.50	2.57	4.27	26.5
DIOXINS AND FURANS																
P8CDD	OCTACHLORODIBENZODIOXIN	ug/kg	1	35.60	35.60	2	1	50.0	49	26	53.1	34.60	7.10	1.04	3.84	64.7
PESTICIDES,HERBICIDES,PCBS																
PIALDR	ALDRIN	ug/kg	1	14.60	67.30	2	2	100.0	50	11	22.0	31.30	5.30	2.95	2.67	26.5
PIBHCB	BETA-BHC (HEXCHLORCYCLHEXANE)	ug/kg	1	6.30	437.70	2	2	100.0	50	19	38.0	52.50	8.80	20.06	4.39	47.1
PIPCBT	PCB, TOTAL.	ug/kg	2	161.60	230.10	2	2	100.0	50	32	64.0	192.80	114.10	1.28	4.58	67.7
PICHLA	ALPHA-CHLORDANE	ug/kg	1	10.50	10.50	2	1	50.0	50	22	44.0	18.80	6.50	2.28	2.41	55.9

PLANT NAME : Mississauga (Clarkson) **SAMPLING TYPE : Treated Sludge**
PLANT TYPE : Secondary **SAMPLE FORM : Dry Weight**

CONTAM-INANT	CONTAMINANT NAME	UNITS (DRY WEIGHT)	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
P1CHLG	GAMMA-CHLORDANE	ug/kg	1	33.50	33.50	2	1	50.0	50	21	42.0	33.60	6.80	1.00	2.58	52.9
P1DMDT	METHOXYCHLOR	ug/kg	1	976.40	976.40	2	1	50.0	50	15	30.0	101.30	34.10	24.65	4.42	38.2
P1HEPE	HEPTACHLOREPOXIDE	ug/kg	2	6.30	6.30	2	1	50.0	50	10	20.0	14.60	5.20	3.27	2.86	23.5
P1HEPT	HEPTACHLOR	ug/kg	3	8.40	8.40	2	1	50.0	50	9	18.0	16.80	4.70	2.67	2.20	23.5
P1OCHL	OXYCHLORDANE	ug/kg	2	8.40	8.40	2	1	50.0	50	6	12.0	16.80	4.20	2.67	2.24	17.7
P1PPDD	PP-DDD	ug/kg	1	8.40	8.40	2	1	50.0	50	7	14.0	16.80	4.60	2.67	2.47	20.6
P1PPDE	PP-DDE	ug/kg	1	10.50	10.50	2	1	50.0	50	34	68.0	18.80	11.10	2.28	2.72	73.5
P245T	2,4,5-TRICLORPHENOXYACETC ACID	ug/kg	3	77.40	77.40	2	1	50.0	50	16	32.0	114.20	84.40	1.73	3.13	41.2
P24D	2,4-DICHLOROPHENOXYACETIC ACID	ug/kg	3	194.60	194.60	2	1	50.0	50	25	50.0	114.40	75.00	2.12	5.81	64.7
P5SILV	SILVEX	ug/kg	3	52.30	52.30	2	1	50.0	50	18	36.0	93.80	92.70	2.29	2.94	44.1
X1HCCP	HEXACHLOROCYCLOPENTADIENE	ug/kg	3	639.70	639.70	2	1	50.0	50	8	16.0	115.60	34.20	11.24	2.76	23.5
X2124	1,2,4-TRICHLOROBENZENE	ug/kg	3	37.70	37.70	2	1	50.0	50	22	44.0	35.60	14.80	1.08	5.02	52.9
X2HCB	HEXACHLOROBENZENE	ug/kg	2	46.00	46.00	2	1	50.0	50	21	42.0	39.40	7.00	1.25	2.96	55.9
VOLATILE ORGANIC COMPOUNDS																
B2EBNZ	ETHYLBENZENE (C8H10)	ug/kg	1	17154.80	31986.50	2	2	100.0	50	14	28.0	23424.80	606.50	1.55	5.59	32.4
B2MPXY	M-, AND P-XYLENES	ug/kg	1	20920.50	43771.00	2	2	100.0	50	15	30.0	30260.70	816.00	1.69	7.11	32.4
B2OXYL	O-XYLENE (C8H10)	ug/kg	1	12343.10	37037.00	2	2	100.0	50	14	28.0	21381.10	523.50	2.17	4.05	32.4
X1111T	1,1,1-TRICHLOROETHANE	ug/kg	1	2323.20	2323.20	2	1	50.0	50	1	2.0	985.90	254.90	3.36	3.34	2.9
X1CHLO	CHLOROFORM (CHCL3)	ug/kg	1	4377.10	4377.10	2	1	50.0	50	12	24.0	1353.30	441.70	5.26	4.33	35.3

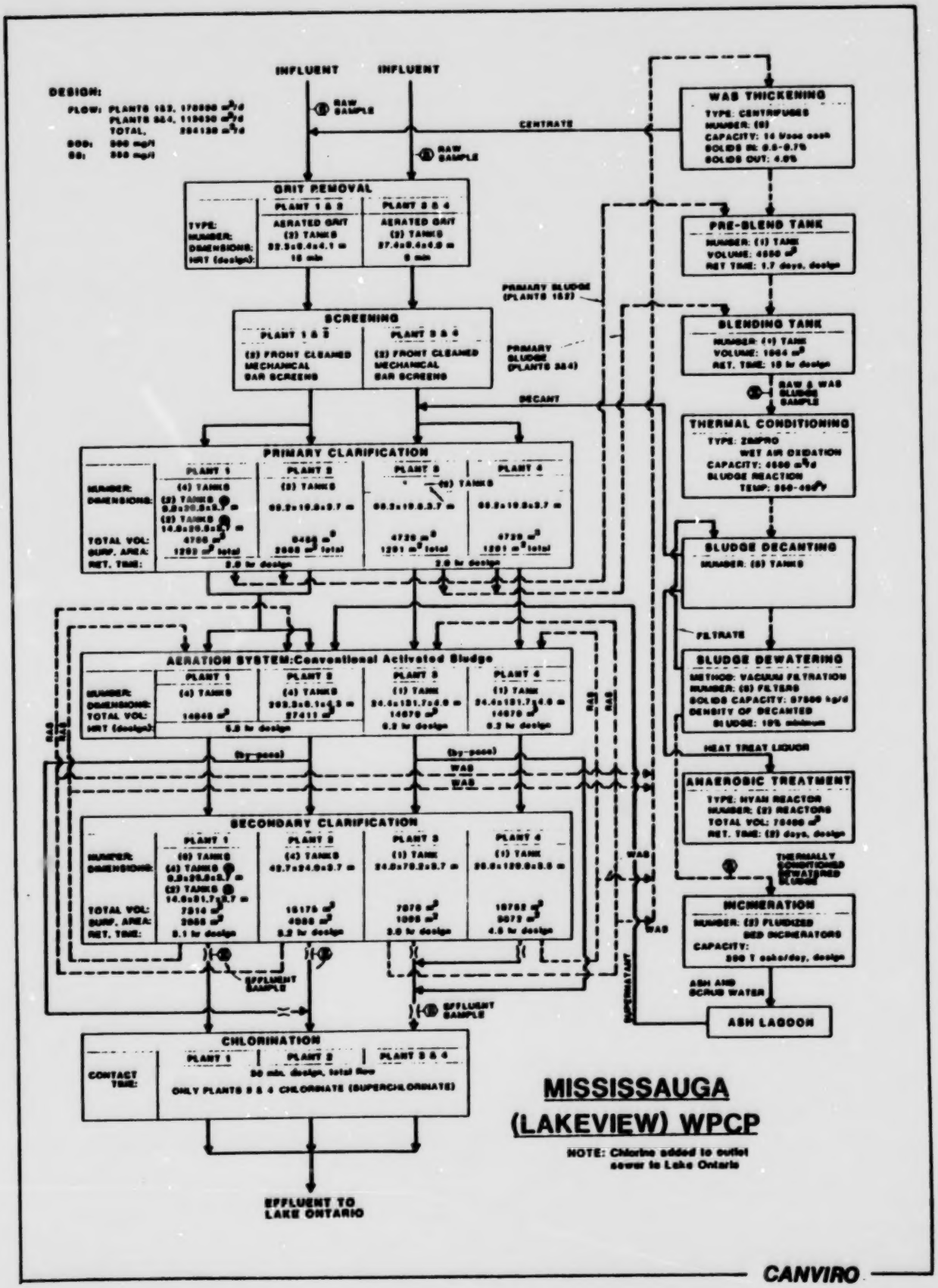
Sub-Appendix A-15

Mississauga (Lakeview)

Contents:

- Plant Schematic with Design Characteristics
- Annual Data Review (1981 - 1986 Plant Performance)
- Sources of Municipal Water Pollution Control Plant Raw Sewage
- Operational Evaluation for Mississauga (Lakeview)
- Analytical Data

(KIR18/28A)


DESIGN:
INFLUENT
INFLUENT
RAW SAMPLE
RAW SAMPLE
CENTRATE
WAS THICKENING
GRIT REMOVAL
PRE-BLEND TANK
PRIMARY SLUDGE (PLANTS 1&2)
SCREENING
BLENDING TANK
PRIMARY SLUDGE (PLANTS 3&4)
RAW & WAS SLUDGE SAMPLE
DECANT
THERMAL CONDITIONING
PRIMARY CLARIFICATION
SLUDGE DECANTING
FILTRATE
AERATION SYSTEM:Conventional Activated Sludge
SLUDGE DEWATERING
HEAT TREAT LIQUOR
ANAEROBIC TREATMENT
SECONDARY CLARIFICATION
INCINERATION
EFFLUENT SAMPLE
EFFLUENT SAMPLE
ASH AND SCRUB WATER
ASH LAGOON
CHLORINATION
EFFLUENT TO LAKE ONTARIO
MISSISSAUGA
(LAKEVIEW) WPCP
NOTE: Chlorine added to outlet sewer to Lake Ontario
CANVIRO

LAKEVIEW WPCP SOUTH-PEEL SYSTEM
Conventional Activated Sludge
Phosphorus Removal - Continuous
Capacity - 227.300 10(3)m3/day

PARAMETER	1981	1982	1983	1984	1985	5 YEAR AVERAGE 81-85
Avg. Daily Flow (1000 m3/day)	178.99	194.62	198.57	198.76	238.52	198.69
BOD5 - Influent (mg/L)	236.50	284.75	350.83	450.17	274.42	319.35
BOD5 - Effluent (mg/L)	16.50	19.69	16.00	18.60	16.50	17.49
Annual BOD5 Significantly Different from Mean Annual Average BOD5?	N	N	N	N	N	
TSS - Influent (mg/L)	240.92	220.67	290.92	357.92	257.25	273.53
TSS - Effluent (mg/L)	14.90	17.19	19.75	18.80	15.67	17.30
Annual TSS Significantly Different from Mean Annual Average TSS?	N	N	N	N	N	
Total P - Influent (mg/L)	8.11	11.84	11.17	13.90	8.37	10.72
Total P - Effluent (mg/L)	0.70	0.70	0.09	0.05	0.65	0.77
Annual TP Significantly Different from Mean Annual Average TP?	N	N	N	N	N	
TP in Compliance?	Y	Y	Y	Y	Y	Y

I.D. - Insufficient Data

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SOURCES OF MUNICIPAL WATER POLLUTION CONTROL PLANT RAW SEWAGE

GENERAL DESCRIPTION OF WATER POLLUTION CONTROL PLANT (WPCP)

NAME OF WPCP	LAKEVIEW WPCP
WORKS NUMBER	110001284
TREATMENT TYPE	CONVENTIONAL ACTIVATED SLUDGE PHOSPHORUS REMOVAL-CONTINUOUS
DESIGN CAPACITY (1000 m3/d)	284.125
1986 AVERAGE DAY FLOW (1000 m3/d)	350.038
POPULATION SERVED	370000

% OF TOTAL FLOW ATTRIBUTED TO:

INDUSTRIAL SOURCES (%)	12
COMMERCIAL SOURCES (%) (Population x 0.0757)	8
RESIDENTIAL SOURCES (%) (Population x 0.175)	18
UNACCOUNTED FOR, INCL. INFILTRATION (100-% Contributed from industrial, commercial and residential sources)	62

PROFILE OF INDUSTRIES IN CATCHMENT

TOTAL NO OF INDUSTRIES	2515
INDUSTRIES WITH WATER	741
NO OF SIC CATEGORIES	68

DESCRIPTION OF THE TOP 5 INDUSTRIES DISCHARGED TO THE WPCP (BASED ON WATER USE DATA)

DESCRIPTION	SIC	# OF COMPANIES
TRANSPORTATION EQ'T	3711-3799	93
PULP,PAPER,PAPERBOARD MILLS	2600-2631	4
MACHINERY MFG	3500-3599	531
GRAIN MILLS	2041-2048	10
METAL FINISHING	3411-3469	251

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OPERATIONAL EVALUATION FOR: MISSISSAUGA (LAKEVIEW) WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: March 6, 1987
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: 284,130 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
RAW SEWAGE FLOW	220,456	230,831	216,008	235,942	254,248	238,667	218,956
% of Design Flow	77.59%	81.24%	76.02%	83.04%	89.48%	84.00%	77.06%
Influent BOD (mg/L)	326.0	333.0	316.0	411.0	366.0	355.0	
Primary BOD (mg/L)							
Secondary BOD (mg/L)	8.0	8.0	8.0	16.0		9.0	14.0
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	97.5%	97.6%	97.5%	96.1%		97.5%	
Influent SS (mg/L)			208.0		240.0		
Primary SS (mg/L)							
Secondary SS (mg/L)	13.0	9.0	13.0		21.0	21.0	27.0
% PRIMARY REMOVAL							
% SECONDARY REMOVAL			93.7%		91.2%		
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)	8.42	8.75		11.42			
Primary Total P (mg/L)							
Secondary Total P (mg/L)	0.75	0.51		1.35		0.67	1.25
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	91.1%	94.2%		88.2%			

OPERATIONAL EVALUATION FOR: MISSISSAUGA (LAKEVIEW) WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: March 6, 1987
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: 284,130 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 8	DAY 9	DAY 10	DAY 11	DAY 12	DAY 13	DAY 14
RAW SEWAGE FLOW	237,758	219,444	272,253	230,221	256,416	237,536	333,813
% of Design Flow	83.68%	77.23%	95.82%	81.03%	90.25%	83.60%	117.49%
Influent BOD (mg/L)	155.0	258.0	324.0	299.0	509.0	331.0	
Primary BOD (mg/L)							
Secondary BOD (mg/L)	10.0	11.0	27.0	9.0			
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	93.5%	95.7%	91.7%	97.0%			
Influent SS (mg/L)							
Primary SS (mg/L)							
Secondary SS (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)		8.97		12.25			
Primary Total P (mg/L)							
Secondary Total P (mg/L)	0.77	0.83		0.43	0.49		
% PRIMARY REMOVAL							
% SECONDARY REMOVAL		90.7%		96.5%			

OPERATIONAL EVALUATION FOR: MISSISSAUGA (LAKEVIEW) WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: March 6, 1987
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: 284,130 m3/d

PARAMETER	SAMPLING PERIOD DAY 15	DAY 16	DAY 17	DAY 18	DAY 19	DAY 20	DAY 21
RAW SEWAGE FLOW	327,186	273,711	276,006	262,369	264,240		
% of Design Flow	115.15%	96.33%	97.14%	92.34%	93.00%		
Influent BOD (mg/L)							
Primary BOD (mg/L)							
Secondary BOD (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent SS (mg/L)							
Primary SS (mg/L)							
Secondary SS (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)							
Primary Total P (mg/L)							
Secondary Total P (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							

OPERATIONAL EVALUATION FOR: MISSISSAUGA (LAKEVIEW) WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: July 17, 1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 284,130 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
RAW SEWAGE FLOW			252,974	245,945	267,889	222,603	207,261
% of Design Flow			89.03%	86.56%	94.28%	78.35%	72.95%
Influent BOD (mg/L)			416.0	266.0	259.0	311.0	376.0
Primary BOD (mg/L)							
Secondary BOD (mg/L)				27.0	23.0	26.0	13.0
% PRIMARY REMOVAL							
% SECONDARY REMOVAL				89.8%	91.1%	91.6%	96.5%
Influent SS (mg/L)				164.0	232.0	40.0	176.0
Primary SS (mg/L)							
Secondary SS (mg/L)				17.0		10.0	9.0
% PRIMARY REMOVAL							
% SECONDARY REMOVAL				89.6%		75.0%	94.9%
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)				6.25	7.75		
Primary Total P (mg/L)							
Secondary Total P (mg/L)					0.59	0.79	0.45
% PRIMARY REMOVAL							
% SECONDARY REMOVAL					92.4%		

OPERATIONAL EVALUATION FOR: MISSISSAUGA (LAKEVIEW) WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: July 17, 1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 284,130 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 8	DAY 9	DAY 10	DAY 11	DAY 12	DAY 13	DAY 14
RAW SEWAGE FLOW	242,192	262,310	272,465	322,262	318,249	273,697	213,817
% of Design Flow	85.24%	92.32%	95.89%	113.42%	112.01%	96.33%	75.25%
Influent BOD (mg/L)	365.0	403.0	390.0	384.0	384.0	414.0	180.0
Primary BOD (mg/L)							
Secondary BOD (mg/L)	19.0	23.0	15.0	17.0	23.0	23.0	23.0
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	94.8%	94.3%	96.2%	95.6%	94.0%	94.4%	87.2%
Influent SS (mg/L)	192.0	308.0	216.0	192.0	352.0	240.0	188.0
Primary SS (mg/L)							
Secondary SS (mg/L)	6.0	26.0	10.0	7.0	52.0	25.0	13.0
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	96.9%	91.6%	95.4%	96.4%	85.2%	89.6%	93.1%
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)	4.92			3.92	5.58		
Primary Total P (mg/L)							
Secondary Total P (mg/L)	0.27	0.99		0.55	0.87	0.75	0.49
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	94.5%			86.0%	84.4%		

OPERATIONAL EVALUATION FOR: MISSISSAUGA (LAKEVIEW) WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: July 17, 1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 284,130 m3/d

PARAMETER	SAMPLING PERIOD DAY 15	DAY 16	DAY 17	DAY 18	DAY 19	DAY 20	DAY 21
RAW SEWAGE FLOW	231,837	326,100	243,693	256,937	256,325		
% of Design Flow	81.60%	114.77%	85.77%	90.43%	90.21%		
Influent BOD (mg/L)	173.0	210.0	188.0	195.0	229.0		
Primary BOD (mg/L)							
Secondary BOD (mg/L)		23.0	23.0	24.0	24.0		
% PRIMARY REMOVAL							
% SECONDARY REMOVAL		89.0	87.8	87.7	89.5		
Influent SS (mg/L)	208.0	472.0	204.0	232.0	164.0		
Primary SS (mg/L)							
Secondary SS (mg/L)	49.0	125.0	5.0	42.0	76.0		
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	76.4	73.5	97.5	81.9	53.7		
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)	6.42		7.75	8.75			
Primary Total P (mg/L)							
Secondary Total P (mg/L)	0.97		0.91	1.13			
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	84.9		88.3	87.1			

PLANT NAME : Mississauga (Lakeview)
PLANT TYPE : Secondary

SAMPLING TYPE : Raw Sewage
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	PLANT MIN. CONC. > - DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0	127.00	322.00	10	10	100.0	267	266	99.6	225.91	140.23	1.32	1.93	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0	420.00	694.00	8	8	100.0	260	258	99.2	525.01	287.75	1.20	1.82	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0	24.00	95.00	10	10	100.0	271	271	100.0	40.21	22.39	1.60	1.81	100.0
NNHTPR	AMMONIUM,TOTAL FILT.REAC.	mg/L	0	12.30	19.10	10	10	100.0	275	274	99.6	15.63	15.37	1.15	1.69	100.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0	23.30	33.30	10	10	100.0	273	273	100.0	27.66	25.44	1.10	1.47	100.0
PH	(-LOG(H+(CONCN))		0	6.09	6.74	10	10	100.0	275	275	100.0	6.54	6.90	1.03	1.05	100.0
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/L	0	6.13	11.10	11	11	100.0	248	248	100.0	8.30	5.18	1.17	1.51	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0	168.00	275.00	10	10	100.0	267	266	99.6	199.62	126.88	1.20	1.93	100.0
RSPLOI	RESIDUE,PAR.LOSS ON IGNI.	mg/L	0	148.00	202.00	5	5	100.0	90	89	98.9	167.99	100.84	1.13	1.78	100.0
PHNOL	PHENOLICS (4AAP)	mg/L	0	0.58	0.58	10	1	10.0	275	37	13.5	0.27	0.31	1.30	2.05	37.8
METALS																
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	980.00	3400.00	12	12	100.0	322	306	95.0	1310.00	1000.10	1.42	2.65	97.3
CCNFUR	CYANIDE-FREE,UNFILT.REAC.	ug/L	0	10.00	100.00	10	10	100.0	271	82	30.3	40.00	1.90	1.96	6.88	32.4
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	120.00	470.00	12	12	100.0	322	237	73.6	190.00	51.10	1.45	3.44	89.2
CUUT	COPPER,UNFILT.TOTAL	ug/L	0	190.00	240.00	2	2	100.0	49	48	98.0	210.00	110.60	1.18	2.28	97.1
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	0.19	0.40	10	10	100.0	283	274	96.8	0.27	0.23	1.35	2.11	100.0
NIUT	NICKEL,UNFILT.TOTAL	ug/L	0	140.00	350.00	12	12	100.0	322	103	32.0	240.00	38.80	1.31	2.70	54.1
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	270.00	940.00	12	12	100.0	319	318	99.7	340.00	370.70	1.40	2.14	100.0
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	320.00	770.00	12	12	100.0	322	315	97.8	490.00	211.00	1.32	2.94	100.0
CDUT	CADMIUM,UNFILT.TOTAL	ug/L	0	10.00	70.00	12	8	66.7	322	76	23.6	10.00	6.50	2.70	2.09	70.3
AGUT	SILVER,UNFILT.TOTAL	ug/L	0	10.00	30.00	12	5	41.7	321	82	25.6	10.00	10.40	2.36	2.55	75.7
ASUT	ARSENIC,UNFILT.TOTAL	ug/L	0	60.00	60.00	11	3	27.3	308	3	1.0	20.00	16.80	1.91	1.83	2.7
SEUT	SELENIUM,UNFILT.TOTAL	ug/L	0	80.00	80.00	11	3	27.3	308	5	1.6	20.00	17.30	2.19	2.07	5.4
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PMMCRE	M-CRESOL	ug/L	1	19.60	78.50	10	8	80.0	275	167	60.7	34.39	25.59	2.45	3.45	86.5
PMBBP	BUTYL.BENZYLPHTHALATE	ug/L	1	14.60	22.70	10	5	50.0	275	34	12.4	9.41	5.85	1.97	1.66	37.8
PMPHEN	PHENOL	ug/L	2	17.80	56.10	10	4	40.0	275	118	42.9	12.98	14.52	2.15	2.46	78.4
PNFLUO	FLUORENE	ug/L	1	24.50	24.50	10	1	10.0	275	1	0.4	5.86	5.02	1.65	1.28	2.7
PESTICIDES,HERBICIDES,PCBS																
P1BHCG	GAMMA-BHC(HEXCHLORCYCLHEXANE)	ug/L	2	0.03	0.07	10	8	80.0	276	143	51.8	0.03	0.02	1.95	2.29	94.6
P1PCBT	PCB, TOTAL	ug/L	2	0.14	0.49	10	6	60.0	276	42	15.2	0.11	0.06	2.57	2.31	46.0
P24D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	0.06	0.77	10	6	60.0	276	214	77.5	0.07	0.13	3.53	3.72	100.0
P1BHCB	BETA-BHC (HEXCHLORCYCLHEXANE)	ug/L	1	0.02	0.12	10	5	50.0	276	32	11.6	0.02	0.01	2.76	1.66	35.1
X2124	1,2,4-TRICHLOROBENZENE	ug/L	3	0.05	0.07	10	4	40.0	276	35	12.7	0.02	0.01	2.33	2.48	40.5
P3SILV	SILVEX	ug/L	3	0.11	0.96	10	3	30.0	276	28	10.1	0.09	0.06	3.10	1.68	40.5
P1BHCA	ALPHA-BHC(HEXCHLORCYCLHEXANE)	ug/L	1	0.02	0.03	10	2	20.0	276	16	5.8	0.01	0.01	1.48	1.50	18.9
P1CHLA	ALPHA-CHLORDANE	ug/L	1	0.03	2.00	10	2	20.0	276	7	2.5	0.02	0.01	5.33	1.46	13.5
P1CHLG	GAMMA-CHLORDANE	ug/L	1	0.04	2.10	10	2	20.0	276	9	3.3	0.02	0.01	5.47	1.49	16.2
P1DMDT	METHOXYCHLOR	ug/L	1	0.20	5.90	10	2	20.0	276	47	17.0	0.09	0.08	4.59	3.14	43.2
P1ALDR	ALDRIN	ug/L	1	0.03	0.03	10	1	10.0	276	3	1.1	0.01	0.01	1.42	1.21	8.1
P1DIEL	DIELDRIN	ug/L	2	0.04	0.04	10	1	10.0	276	8	2.9	0.01	0.01	1.55	1.28	18.9
P1END2	ENDOSULFAN II	ug/L	3	0.02	0.02	10	1	10.0	276	10	3.6	0.01	0.01	1.25	1.42	21.6
P1HEPE	HEPTACHLOREPOXIDE	ug/L	2	0.03	0.03	10	1	10.0	276	2	0.7	0.01	0.01	1.42	1.19	5.4
P1HEPT	HEPTACHLOR	ug/L	3	0.22	0.22	10	1	10.0	276	10	3.6	0.01	0.01	2.66	1.48	18.9
P1PPDD	PP-DDD	ug/L	1	0.03	0.03	10	1	10.0	276	6	2.2	0.01	0.01	1.42	1.38	13.5

PLANT NAME : Mississauga (Lakeview)
PLANT TYPE : Secondary

SAMPLING TYPE : Raw Sewage
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	PLANT MIN. CONC. > nDL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
PESTICIDES,HERBICIDES,PCBS																
P1PPDE	PP-DDE	ug/L	1	0.42	0.42	10	1	10.0	276	15	5.4	0.01	0.01	3.26	1.74	24.3
X1HCCP	HEXACHLOROCYCLOPENTADIENE	ug/L	3	0.13	0.13	10	1	10.0	276	5	1.8	0.10	0.10	1.09	1.30	13.5
VOLATILES ORGANIC COMPOUNDS																
X1111T	1,1,1-TRICHLOROETHANE	ug/L	1	55.00	98.00	10	2	20.0	274	21	7.7	25.94	23.18	1.76	1.74	18.9
X1CHLO	CHLOROFORM	ug/L	1	87.00	103.00	10	2	20.0	274	28	10.2	27.29	23.90	1.93	1.75	32.4
B2MPXY	M-, AND P-XYLENES	ug/L	1	56.00	56.00	10	1	10.0	274	43	15.7	22.17	26.00	1.58	2.02	37.8
X1CDBM	CHLORODIBROMOMETHANE	ug/L	1	67.00	67.00	10	1	10.0	274	2	0.7	22.57	20.16	1.47	1.10	5.4

PLANT NAME : Mississauga (Lakeview)
PLANT TYPE : Secondary

SAMPLING TYPE : Final Effluent
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	STD. FOR SURFACE WATER	STD. REF.	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET.	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																		
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0		-	13.70	68.40	9	9	100.0	213	211	99.1	23.59	21.22	1.76	2.07	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0		-	84.00	182.00	9	9	100.0	213	211	99.1	99.96	52.80	1.28	1.83	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0		-	4.00	17.50	10	10	100.0	220	220	100.0	13.06	8.09	1.55	1.60	100.0
NNHTPR	AMMONIUM,TOTAL FILT.REAC.	mg/L	0		-	6.75	21.70	10	10	100.0	223	204	91.5	13.58	3.90	1.50	6.98	100.0
NNO2PR	NITRITE,FILT. REACT.	mg/L	0		-	0.36	3.30	10	10	100.0	220	194	88.2	0.88	0.22	2.02	5.95	96.4
NNOTPR	NITRATES,TOTAL FILT.REAC.	mg/L	0		-	0.75	5.95	10	10	100.0	224	186	83.0	2.11	2.33	2.23	7.75	96.4
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0		-	15.20	25.60	10	10	100.0	222	222	100.0	20.22	7.97	1.20	2.71	100.0
PH	(-LOG(H+(CONC))		0		-	6.50	7.58	10	10	100.0	224	224	100.0	7.06	7.10	1.04	1.05	100.0
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/L	0		-	0.36	5.45	11	11	100.0	211	206	97.6	1.10	0.68	2.48	1.97	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0		-	7.30	118.00	10	10	100.0	220	219	99.6	25.40	10.12	2.76	2.00	100.0
RSFLOI	RESIDUE,PAR.LOSS ON IGNI.	mg/L	0		-	20.60	88.80	5	5	100.0	77	58	75.3	43.48	7.47	1.91	2.71	93.3
PHNOL	PHENOLICS (4AAP)	mg/L	0	0.00	ONT-MOE	0.15	0.23	10	2	20.0	225	33	14.7	0.07	0.07	1.75	1.86	53.6
METALS																		
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	0.20	ONT-MOE	0.02	0.33	10	10	100.0	233	220	94.4	0.08	0.03	2.66	2.62	100.0
NIUT	NICKEL,UNFILT.TOTAL	ug/L	0	25.00	ONT-MOE	110.00	220.00	12	12	100.0	267	171	64.0	160.00	22.10	1.25	3.60	85.7
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	3750.00	ONT-MOE	250.00	400.00	12	12	100.0	267	267	100.0	290.00	340.90	1.14	2.14	100.0
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	30.00	ONT-MOE	70.00	560.00	12	12	100.0	267	262	98.1	160.00	53.30	1.81	2.48	100.0
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	100.00	ONT-MOE	20.00	60.00	12	9	75.0	267	137	51.3	20.00	9.00	2.43	2.00	89.3
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	75.00	ONT-MOE	40.00	270.00	12	8	66.7	264	196	74.2	90.00	101.70	2.47	3.72	96.4
CDUT	CADMIUM,UNFILT.TOTAL	ug/L	0	0.20	ONT-MOE	0.00	10.00	12	7	58.3	267	65	24.3	0.00	2.10	1.72	2.07	71.4
CUUT	COPPER,UNFILT.TOTAL	ug/L	0	5.00	ONT-MOE	60.00	60.00	2	1	50.0	47	30	63.8	20.00	13.10	5.80	2.56	77.8
MOUT	MOLYBDENUM,UNFILT.TOTAL	ug/L	0		-	10.00	20.00	12	5	41.7	267	75	28.1	10.00	6.60	1.82	1.56	67.9
CCNPUR	CYANIDE-FREE,UNFILT.REAC.	ug/L	0	5.00	ONT-MOE	10.00	10.00	10	4	40.0	222	42	18.9	0.00	1.30	3.43	3.68	48.4
ASUT	ARSENIC,UNFILT.TOTAL	ug/L	0	100.00	ONT-MOE	60.00	60.00	11	3	27.3	252	3	1.2	20.00	16.70	1.91	1.67	3.6
SEUT	SELENIUM,UNFILT.TOTAL	ug/L	0	100.00	ONT-MOE	80.00	80.00	11	3	27.3	252	3	1.2	20.00	17.10	2.19	1.89	3.6
COUT	COBALT,UNFILT.TOTAL	ug/L	0	5.00	NYS-STD	10.00	10.00	12	3	25.0	266	65	24.4	10.00	6.40	1.37	1.54	82.1
PBUT	LEAD,UNFILT.TOTAL	ug/L	0	25.00	ONT-MOE	20.00	30.00	12	3	25.0	267	25	9.4	20.00	16.50	1.62	1.48	60.7
AGUT	SILVER,UNFILT.TOTAL	ug/L	0	0.10	ONT-MOE	10.00	10.00	12	1	8.3	267	15	5.6	10.00	6.90	1.84	1.84	32.1
PESTICIDES,HERBICIDES,PCBS																		
P1BHCG	GAMMA-BHC(HEXCHLORCYCLOHEXANE)	ug/L	2	0.06	ONT-MOE	0.01	0.03	10	10	100.0	227	157	69.2	0.02	0.02	1.30	2.48	96.4
P324D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	4.00	ONT-MOE	0.04	0.26	10	5	50.0	227	177	78.0	0.03	0.02	3.32	4.71	100.0
P1BHCB	BETA-BHC (HEXCHLORCYCLOHEXANE)	ug/L	1	0.01	ONT-MOE	0.01	0.02	10	2	20.0	227	9	4.0	0.01	0.01	1.60	1.38	21.4
P1CHLA	ALPHA-CHLORDANE	ug/L	1	0.00	NYS-GUL	0.01	0.02	10	2	20.0	227	5	2.2	0.01	0.01	1.60	1.31	14.3
P1CHLG	GAMMA-CHLORDANE	ug/L	1	0.06	ONT-MOE	0.02	0.02	10	2	20.0	227	5	2.2	0.01	0.01	1.79	1.36	14.3
P1DMDT	METHOXYCHLOR	ug/L	1	0.04	ONT-MOE	0.10	0.50	10	2	20.0	227	31	13.7	0.04	0.04	2.71	2.72	35.7
P1PCBT	PCB, TOTAL	ug/L	2	0.00	ONT-MOE	0.18	0.18	10	1	10.0	227	9	4.0	0.02	0.02	2.00	1.40	28.6
P245ST	2,4,5-TRICLORPHENOXYACETIC ACID	ug/L	3		-	0.05	0.05	10	1	10.0	227	25	11.0	0.03	0.03	1.25	2.27	42.9
VOLATILES ORGANIC COMPOUNDS																		
X1CHLO	CHLOROFORM	ug/L	1	0.20	NYS-STD	2.80	5.30	10	3	30.0	224	37	16.5	1.53	1.37	2.02	2.18	64.3
X1111T	1,1,1-TRICHLOROETHANE	ug/L	1	50.00	NYS-GUL	3.30	6.40	10	2	20.0	224	18	8.0	1.36	1.18	1.94	1.86	28.6
X1BDCM	BROMODICHLOROMETHANE	ug/L	1	50.00	NYS-GUL	4.10	4.10	10	1	10.0	224	7	3.1	1.66	1.55	1.37	1.20	17.9

PLANT NAME : Mississauga (Lakeview)
PLANT TYPE : Secondary

SAMPLING TYPE : Raw Sludge
SAMPLE FORM : Dry Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS (DRY WEIGHT)	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
COD	CHEMICAL OXYGEN DEMAND	mg/kg	0	1410018.55	1410018.55	1	1	100.0	45	45	100.0	1410018.55	892221.45	0.00	3.19	100.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/kg	0	39915.07	49165.12	2	2	100.0	51	51	100.0	44299.32	36097.85	1.16	2.98	100.0
PH	(-LOG(H+CONCN))	mg/kg	0	5.82	7.15	2	2	100.0	49	49	100.0	6.45	6.03	1.16	1.10	100.0
PHNOL	PHENOLICS (4AAP)	mg/kg	0	53.80	150.74	2	2	100.0	50	41	82.0	90.06	82.34	2.07	3.54	85.3
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/kg	0	19363.06	27272.72	2	2	100.0	42	42	100.0	22980.06	20347.70	1.27	4.43	100.0
RST	RESIDUE, TOTAL	mg/kg	0	47100.00	53900.00	2	2	100.0	51	51	100.0	50385.41	32783.51	1.10	1.81	100.0
RSTLOI	RESIDUE,TOT;LOSS ON IGNI.	mg/kg	0	30000.00	36100.00	2	2	100.0	51	51	100.0	32908.97	20803.05	1.14	1.77	100.0
NNHTPR	AMMONIUM,TOTAL FIL.T.REAC.	mg/kg	0	16734.69	16734.69	2	1	50.0	48	47	97.9	94.25	5911.32	******	4.59	100.0
NNOTPR	NITRATES,TOTAL FIL.T.REAC.	mg/kg	0	31.54	31.54	2	1	50.0	48	43	89.6	4.09	25.44	17.96	2.21	93.9
METALS																
AGUT	SILVER,UNFILT.TOTAL	mg/kg	0	43.23	48.83	2	2	100.0	45	40	88.9	45.94	30.17	1.09	2.61	84.4
ALUT	ALUMINUM,UNFILT.TOTAL	mg/kg	0	5280.89	5520.17	2	2	100.0	51	51	100.0	5399.20	9835.74	1.03	2.51	100.0
ASUT	ARSENIC,UNFILT.TOTAL	mg/kg	0	5.31	7.61	2	2	100.0	51	50	98.0	6.35	6.13	1.29	2.01	97.1
CDUT	CADMIUM,UNFILT.TOTAL	mg/kg	0	25.23	25.48	2	2	100.0	43	40	93.0	25.35	9.74	1.01	4.35	90.0
COUT	COBALT,UNFILT.TOTAL	mg/kg	0	7.01	25.23	2	2	100.0	41	30	73.2	13.30	9.29	2.47	4.69	73.3
CRUT	CHROMIUM,UNFILT.TOTAL	mg/kg	0	475.51	700.64	2	2	100.0	51	50	98.0	577.20	301.43	1.32	3.68	97.1
CUUT	COPPER,UNFILT.TOTAL	mg/kg	0	726.35	806.79	2	2	100.0	46	46	100.0	765.51	606.31	1.08	1.72	100.0
HGUT	MERCURY,UNFILT.TOTAL	mg/kg	0	2.78	3.82	2	2	100.0	50	50	100.0	3.26	2.23	1.25	1.67	100.0
MOUT	MOLYBDENUM,UNFILT.TOTAL	mg/kg	0	7.42	12.10	2	2	100.0	37	23	62.2	9.48	5.80	1.41	2.88	64.3
NIUT	NICKEL,UNFILT.TOTAL	mg/kg	0	203.82	218.55	2	2	100.0	46	44	95.7	211.06	59.17	1.05	2.90	93.3
PBUT	LEAD,UNFILT.TOTAL	mg/kg	0	161.36	245.64	2	2	100.0	49	48	98.0	199.09	173.99	1.35	2.24	96.9
SEUT	SELENIUM,UNFILT.TOTAL	mg/kg	0	2.76	3.90	2	2	100.0	50	48	96.0	3.28	3.04	1.28	1.93	93.9
SRUT	STRONTIUM,UNFILT.TOTAL	mg/kg	0	150.74	225.23	2	2	100.0	51	51	100.0	184.26	231.70	1.33	1.97	100.0
ZNUT	ZINC,UNFILT.TOTAL	mg/kg	0	1049.54	1273.89	2	2	100.0	51	51	100.0	1156.28	905.39	1.15	2.39	100.0
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PM4CRE	M-CRESOL	ug/kg	1	498938.40	498938.40	2	1	50.0	51	42	82.3	37262.50	116847.30	39.22	12.16	85.3
PMNITB	NITROBENZENE	ug/kg	1	10204081.60	10204081.60	2	1	50.0	51	1	2.0	1471R7.90	3405.40	401.26	3.60	2.9
PNNAPH	NAPHTHALENE	ug/kg	1	12653061.20	12653061.20	2	1	50.0	51	6	11.8	163901.50	3823.30	467.18	3.75	14.7
DIOXINS AND FURANS																
P97CDD	HEPTACHLORODIBENZODIOXIN	ug/kg	1	2.10	2.10	2	1	50.0	50	6	12.0	6.20	7.20	4.68	4.12	17.7
P98CDD	OCTACHLORODIBENZODIOXIN	ug/kg	1	8.10	8.10	2	1	50.0	50	25	50.0	8.70	8.50	1.10	3.60	58.8
PESTICIDES,HERBICIDES,PCBS																
P1BHCB	BETA-BHC (HEXACHLORCYCLOHEXANE)	ug/kg	1	4.20	111.30	2	2	100.0	51	18	35.3	21.60	7.40	10.15	3.29	38.2
P1END1	ENDOSULFAN I	ug/kg	3	8.50	129.90	2	2	100.0	51	9	17.7	33.20	4.60	6.88	2.56	20.6
P1HEPE	HEPTACHLOREPOXIDE	ug/kg	2	4.20	185.50	2	2	100.0	51	12	23.5	27.90	5.00	14.56	2.62	32.4
P1PCBT	PCB, TOTAL	ug/kg	2	91.30	334.00	2	2	100.0	51	40	78.4	174.60	88.70	2.50	3.18	79.4
P324D	2,4-DICHLOROPHENOXYACETIC ACID	ug/kg	3	445.90	556.60	2	2	100.0	51	38	74.5	498.20	93.20	1.17	6.50	82.3
P1ALDR	ALDRIN	ug/kg	1	6.40	6.40	2	1	50.0	51	6	11.8	10.90	4.60	2.13	2.50	17.7
P1BHCA	ALPHA-BHC(HEXACHLORCYCLOHEXANE)	ug/kg	1	37.10	37.10	2	1	50.0	51	12	23.5	8.80	5.50	7.62	2.74	35.3
P1CHLA	ALPHA-CHLORDANE	ug/kg	1	34.00	34.00	2	1	50.0	51	18	35.3	25.10	5.90	1.53	2.38	47.1

PLANT NAME : Mississauga (Lakeview)
PLANT TYPE : Secondary

SAMPLING TYPE : Raw Sludge
SAMPLE FORM : Dry Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS (DRY WEIGHT)	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
P1CHLO	GAMMA-CHLORDANE	ug/kg	1	36.10	36.10	2	1	50.0	51	19	37.3	25.90	6.00	1.60	2.44	50.0
P1DIEL	DIELDRIN	ug/kg	3	259.70	259.70	2	1	50.0	51	20	39.2	23.40	7.20	30.16	3.10	50.0
P1DMDT	METHOXYCHLOR	ug/kg	1	538.00	538.00	2	1	50.0	51	19	37.3	75.50	45.80	16.07	5.15	44.1
P1END2	ENDOSULFAN II	ug/kg	3	37.10	37.10	2	1	50.0	51	6	11.8	8.80	4.20	7.62	2.38	17.7
P1ENDR	ENDRIN	ug/kg	3	4.20	4.20	2	1	50.0	51	8	15.7	8.80	4.20	2.86	2.21	23.5
P1ENDS	ENDOSULFAN SULPHATE	ug/kg	3	296.80	296.80	2	1	50.0	51	6	11.8	50.20	18.60	12.33	2.80	17.7
P1HEPT	HEPTACHLOR	ug/kg	3	8.50	8.50	2	1	50.0	51	7	13.7	12.60	4.50	1.74	2.83	20.6
P1PPDR	PP-DDE	ug/kg	1	14.90	14.90	2	1	50.0	51	22	43.1	16.60	7.30	1.17	2.31	52.9
X2124	1,2,4-TRICHLOROBENZENE	ug/kg	3	14.90	14.90	2	1	50.0	51	17	33.3	23.50	9.30	1.91	4.06	41.2
X2HCB	HEXACHLOROBENZENE	ug/kg	2	6.40	6.40	2	1	50.0	51	17	33.3	10.90	3.60	2.13	2.65	38.2
VOLATILE ORGANIC COMPOUNDS																
B2MPXY	M-, AND P-XYLENES	ug/kg	1	7050.10	9978.80	2	2	100.0	51	16	31.4	8387.60	1345.90	1.28	3.86	41.2
B2EBNZ	ETHYLBENZENE (C8H10)	ug/kg	1	4267.20	4267.20	2	1	50.0	51	10	19.6	1346.10	890.70	5.11	2.60	26.5
B2OXYL	O-XYLENE (C8H10)	ug/kg	1	5194.80	5194.80	2	1	50.0	51	8	15.7	1485.20	841.60	5.88	2.51	23.5
X1CHLO	CHLOROFORM (CHCL3)	ug/kg	1	1688.30	1688.30	2	1	50.0	51	12	23.5	846.70	1225.10	2.65	4.24	35.3

PLANT NAME : Mississauga (Lakeview) **SAMPLING TYPE : Treated Sludge**
PLANT TYPE : Secondary **SAMPLE FORM : Dry Weight**

CONTAM-INANT	CONTAMINANT NAME	UNITS (DRY WEIGHT)	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
COD	CHEMICAL OXYGEN DEMAND	mg/kg	0	1050218.80	1050218.80	1	1	100.0	36	36	100.0	1050218.80	508097.94	0.00	4.65	100.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/kg	0	14400.02	15399.99	2	2	100.0	49	49	100.0	14891.61	38494.12	1.05	1.77	100.0
PH	(-LOG(H+(CONCN))	mg/kg	0	5.70	6.50	2	2	100.0	47	47	100.0	6.09	7.17	1.10	1.09	100.0
PHENOL	PHENOLICS (4AAP)	mg/kg	0	43.76	85.90	2	2	100.0	49	41	83.7	61.31	43.05	1.61	3.14	87.9
PPUT	PHOSPHORUS,UNFILT.TOTAL.	mg/kg	0	45609.98	16094159.99	2	2	100.0	43	43	100.0	856769.73	76638.67	63.30	6.91	100.0
RST	RESIDUE, TOTAL.	mg/kg	0	454000.00	479900.00	2	2	100.0	50	50	100.0	466770.39	80434.04	1.04	3.23	100.0
RSTLOI	RESIDUE,TOT.LOSS ON IGNI.	mg/kg	0	114151.00	226177.00	2	2	100.0	50	50	100.0	160680.84	43379.33	1.62	3.19	100.0
METALS																
AGUT	SILVER,UNFIL.T.TOTAL.	mg/kg	0	60.07	77.83	2	2	100.0	44	44	100.0	68.37	37.78	1.20	2.33	100.0
ALUT	ALUMINUM,UNFILT.TOTAL.	mg/kg	0	7635.29	9168.58	2	2	100.0	50	50	100.0	8366.88	10715.94	1.14	2.82	100.0
ASUT	ARSENIC,UNFILT.TOTAL.	mg/kg	0	7.75	8.46	2	2	100.0	50	49	98.0	8.10	5.40	1.06	2.08	97.1
CDUT	CADMIUM,UNFIL.T.TOTAL.	mg/kg	0	32.51	56.26	2	2	100.0	45	41	91.1	42.77	10.47	1.47	3.98	90.3
CRUT	CHROMIUM,UNFILT.TOTAL.	mg/kg	0	665.15	1021.05	2	2	100.0	50	50	100.0	824.11	333.06	1.35	3.59	100.0
CUUT	COPPER,UNFIL.T.TOTAL.	mg/kg	0	1000.21	1266.70	2	2	100.0	45	45	100.0	1125.59	732.24	1.18	2.16	100.0
HGUT	MERCURY,UNFIL.T.TOTAL.	mg/kg	0	3.33	7.50	2	2	100.0	50	49	98.0	5.00	3.24	1.78	2.06	97.1
NIUT	NICKEL,UNFIL.T.TOTAL.	mg/kg	0	278.13	333.40	2	2	100.0	45	42	93.3	304.51	72.95	1.14	2.95	90.0
PBUT	LEAD,UNFIL.T.TOTAL.	mg/kg	0	333.40	341.19	2	2	100.0	50	49	98.0	337.27	196.62	1.02	2.46	97.1
SEUT	SELENIUM,UNFILT.TOTAL.	mg/kg	0	4.58	5.21	2	2	100.0	50	48	96.0	4.89	2.67	1.10	2.98	97.1
SRUT	STRONTIUM,UNFIL.T.TOTAL.	mg/kg	0	218.80	314.16	2	2	100.0	50	50	100.0	262.18	240.93	1.29	2.56	100.0
ZNUT	ZINC,UNFIL.T.TOTAL.	mg/kg	0	1474.43	2083.77	2	2	100.0	50	50	100.0	1752.82	988.90	1.28	2.57	100.0
COUT	COBALT,UNFIL.T.TOTAL.	mg/kg	0	35.48	35.48	2	1	50.0	39	32	82.1	19.23	9.14	2.38	2.75	85.7
MOUT	MOLYBDENUM,UNFIL.T.TOTAL.	mg/kg	0	7.64	7.64	2	1	50.0	34	23	67.7	14.11	6.41	2.38	2.84	69.2
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PMMCRE	M-CRESOL	ug/kg	1	178578.90	178578.90	2	1	50.0	50	15	30.0	7681.30	5281.80	85.58	9.20	35.3
PMNITB	NITROBENZENE	ug/kg	1	17400.90	17400.90	2	1	50.0	50	3	6.0	1904.30	1405.80	22.85	3.46	8.8
DIOXINS AND FURANS																
P98CDD	OCTACHLORODIBENZODIOXIN	ug/kg	1	5.30	8.80	2	2	100.0	49	26	53.1	6.80	7.10	1.43	3.84	64.7
P97CDD	HEPTACHLORODIBENZODIOXIN	ug/kg	1	3.80	3.80	2	1	50.0	49	10	20.4	4.10	5.00	1.11	3.21	23.5
PESTICIDES,HERBICIDES,PCBS																
PDIEL	DIELDRIN	ug/kg	2	5.80	305.00	2	2	100.0	50	15	30.0	42.10	6.50	16.48	3.51	38.2
PHEPE	HEPTACHLOREPOXIDE	ug/kg	2	22.50	148.90	2	2	100.0	50	10	20.0	57.90	5.20	3.80	2.86	23.5
PPPDE	PP-DDE	ug/kg	1	4.50	8.10	2	2	100.0	50	34	68.0	6.00	11.10	1.52	2.72	73.5
X2124	1,2,4-TRICHLOROBENZENE	ug/kg	3	27.30	50.70	2	2	100.0	50	22	44.0	37.20	14.80	1.55	5.02	52.9
X2HCB	HEXACHLOROBENZENE	ug/kg	2	4.70	5.90	2	2	100.0	50	21	42.0	5.30	7.00	1.17	2.96	55.9
P0PCNB	PCNB	ug/kg	2	60.00	60.00	2	1	50.0	22	2	9.1	25.00	22.60	3.45	1.51	14.3
P1BHCA	ALPHA-BHC(HEXACHLORCYCLOHEXANE)	ug/kg	1	50.60	50.60	2	1	50.0	50	11	22.0	10.30	5.60	9.49	3.00	32.4
P1BHCB	BETA-BHC (HEXACHLORCYCLOHEXANE)	ug/kg	1	621.70	621.70	2	1	50.0	50	19	38.0	36.10	8.80	55.91	4.39	47.1
P1DMDT	METHOXYCHLOR	ug/kg	1	143.10	143.10	2	1	50.0	50	15	30.0	38.60	34.10	6.38	4.42	38.2
P1END1	ENDOSULFAN I	ug/kg	3	69.90	69.90	2	1	50.0	50	6	12.0	12.10	4.90	11.92	2.96	11.8
P1END2	ENDOSULFAN II	ug/kg	3	81.30	81.30	2	1	50.0	50	7	14.0	13.10	4.70	13.27	2.67	20.6
P1ENDR	ENDRIN	ug/kg	3	4.70	4.70	2	1	50.0	50	5	10.0	3.20	4.20	1.71	2.36	14.7

PLANT NAME : Mississauga (Lakeview)
PLANT TYPE : Secondary

SAMPLING TYPE : Treated Sludge
SAMPLE FORM : Dry Weight

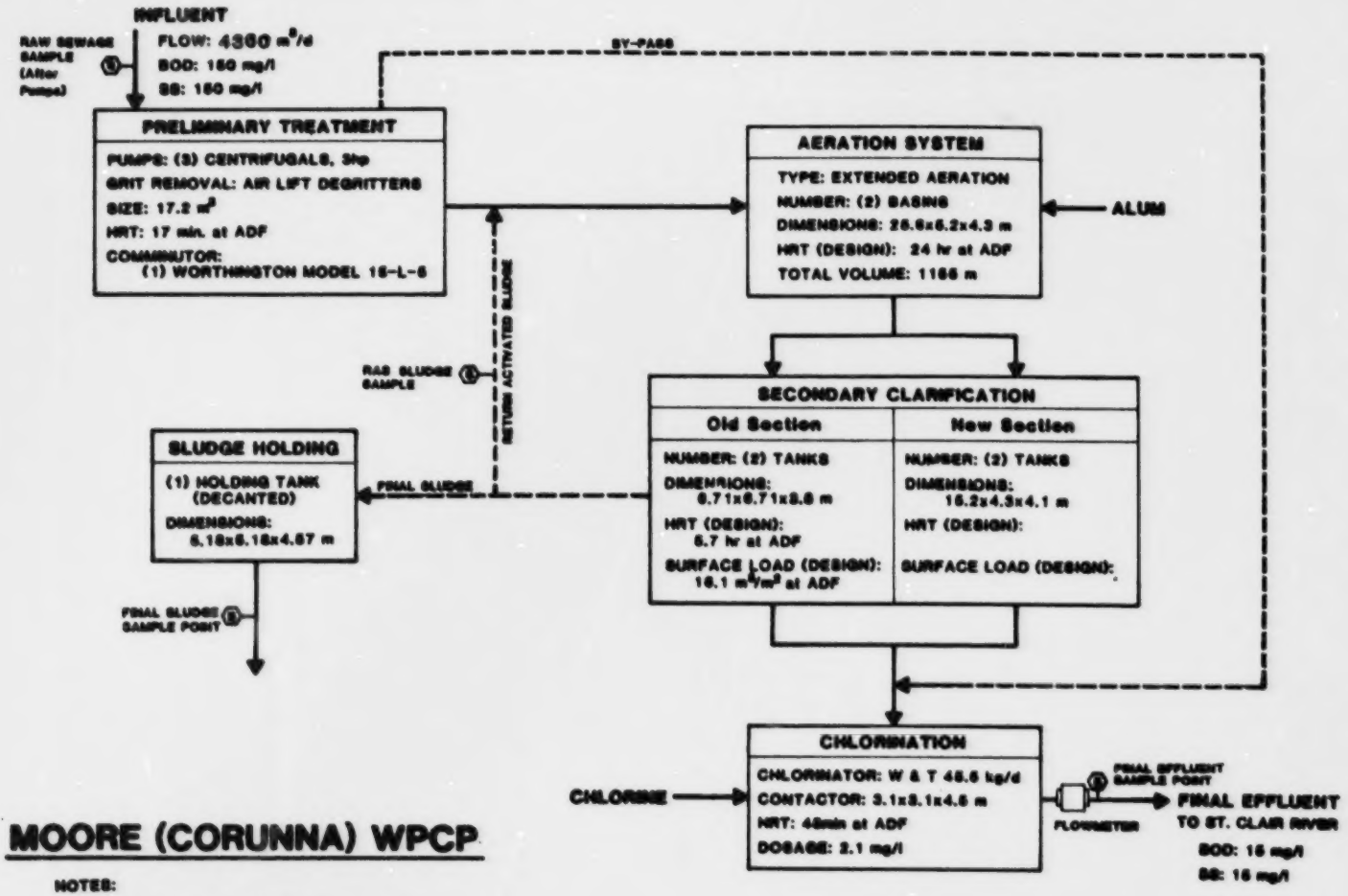
CONTAM-INANT	CONTAMINANT NAME	UNITS (DRY WEIGHT)	QA/QC CODE	PLANT MIN. CONC. > DI.	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
P1PCBT	PCB, TOTAL	ug/kg	2	1210.30	1210.30	2	1	50.0	50	32	64.0	163.20	114.10	17.01	4.58	67.7
P324D	2,4-DICHLOROPHENOXYACETIC ACID	ug/kg	5	25.10	25.10	2	1	50.0	50	25	50.0	16.60	75.00	1.79	5.81	64.7
X1HCCP	HEXACHLOROCYCLOPENTADIENE	ug/kg	5	297.20	297.20	2	1	50.0	50	8	16.0	55.60	34.20	10.70	2.76	23.5
VOLATILE ORGANIC COMPOUNDS																
B2EBNZ	ETHYLBENZENE (C8H10)	ug/kg	1	1630.00	500104.20	2	2	100.0	50	14	28.0	28551.20	606.50	57.34	5.59	32.4
B2MPXY	M-, AND P-XYLENES	ug/kg	1	2643.20	1416961.90	2	2	100.0	50	15	30.0	61199.00	816.00	85.09	7.11	32.4
B2OXYL	O-XYLENE (C8H10)	ug/kg	1	750.20	2083.70	2	2	100.0	50	14	28.0	1250.30	523.50	2.06	4.05	32.4
X1CHLO	CHLOROFORM (CHCL3)	ug/kg	1	748.90	748.90	2	1	50.0	50	12	24.0	176.70	441.70	7.71	4.33	35.3

Sub-Appendix A-16

Moore (Corunna)

Contents:

- Plant Schematic with Design Characteristics
- Annual Data Review (1981 - 1986 Plant Performance)
- Sources of Municipal Water Pollution Control Plant Raw Sewage
- Operational Evaluation for Moore (Corunna)
- Analytical Data



MOORE (CORUNNA) WPCP

NOTES:

1. Effluent flow is measured by a Milltronics ultrasonic flow detector in a parshall flume.

CANVIRO

CORUNNA P.V. PLANT
Extended Aeration
Phosphorus Removal - Continuous
Capacity - 4.546 10(3)m3/day

PARAMETER	1981	1982	1983	1984	1985	MEAN ANNUAL AVERAGE
Avg. Daily Flow (1000 m3/day)	2.11	1.98	1.98	1.43	2.85	2.85
BOD5 - Influent (mg/L)	95.55	133.65	101.52	119.25	124.58	114.83
BOD5 - Effluent (mg/L)	4.51	5.82	4.47	7.48	9.12	6.36
Annual BOD5 Significantly Different from Mean Annual Average BOD5?	N	N	N	N	Y	
TSS - Influent (mg/L)	107.81	159.38	93.25	115.25	138.33	122.12
TSS - Effluent (mg/L)	11.58	9.17	10.48	8.82	9.56	9.89
Annual TSS Significantly Different from Mean Annual Average TSS?	N	N	N	N	N	
Total P - Influent (mg/L)	6.76	6.71	6.98	5.36	7.86	6.95
Total P - Effluent (mg/L)	0.93	0.61	0.98	0.87	0.85	0.85
Annual TP Significantly Different from Mean Annual Average TP?	N	N	N	N	N	
TP in Compliance?	Y	Y	Y	Y	Y	Y

I.D. - Insufficient Data

R

SOURCES OF MUNICIPAL WATER POLLUTION CONTROL PLANT RAW SEWAGE

GENERAL DESCRIPTION OF WATER POLLUTION CONTROL PLANT (WPCP)

NAME OF WPCP	CORUNNA P.V. WPCP
WORKS NUMBER	110000481
TREATMENT TYPE	EXTENDED AERATION PHOSPHORUS REMOVAL CONTINUOUS
DESIGN CAPACITY (1000 m3/d)	4.546
1986 AVERAGE DAY FLOW (1000 m3/d)	2.108
POPULATION SERVED	3405

% OF TOTAL FLOW ATTRIBUTED TO:

INDUSTRIAL SOURCES (%)	0.5
COMMERCIAL SOURCES (%) (Population x 0.0757)	12
RESIDENTIAL SOURCES (%) (Population x 0.175)	28
UNACCOUNTED FOR, INCL. INFILTRATION (100-% Contributed from industrial, commercial and residential sources)	59

PROFILE OF INDUSTRIES IN CATCHMENT

TOTAL NO OF INDUSTRIES	9
INDUSTRIES WITH WATER	3
NO OF SIC CATEGORIES	8

DESCRIPTION OF THE TOP 5 INDUSTRIES DISCHARGED TO THE WPCP (BASED ON WATER USE DATA)

DESCRIPTION	SIC	# OF COMPANIES
INSTRUMENT AND METALS PRODUCT	3811-3873	1
METAL FINISHING	3411-3489	1
MISC. FABRICATED METALS PRODUCTS	3490-3499	1
CHEMICALS/CHEMICAL PREPARATION	2899-2899	1
PLASTICS,RESINS,SYNTHETIC FIBERS MFG	2821-2824	1

OPERATIONAL EVALUATION FOR: MOORE TOWNSHIP (CORRUNA) WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: February 7,1987
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: 4360 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
RAW SEWAGE FLOW	2,172	2,248	1,999	1,965	1,999	1,977	1,940
% of Design Flow	49.82%	51.56%	45.85%	45.07%	45.85%	45.34%	44.50%
Influent BOD (mg/L)			162.0				
Primary BOD (mg/L)							
Secondary BOD (mg/L)			6.0				
% PRIMARY REMOVAL							
% SECONDARY REMOVAL			96.3				
Influent SS (mg/L)			162.0				
Primary SS (mg/L)							
Secondary SS (mg/L)			10.0				
% PRIMARY REMOVAL							
% SECONDARY REMOVAL			93.8				
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)			0.3				
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)			47.5				
Primary TKN (mg/L)							
Secondary TKN (mg/L)			1.4				
% PRIMARY REMOVAL							
% SECONDARY REMOVAL			97.1				
Influent Total P (mg/L)			8.3				
Primary Total P (mg/L)							
Secondary Total P (mg/L)			0.5				
% PRIMARY REMOVAL							
% SECONDARY REMOVAL			94.5				

OPERATIONAL EVALUATION FOR: MOORE TOWNSHIP (CORRUNA) WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: February 7,1987
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: 4360 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 8	DAY 9	DAY 10	DAY 11	DAY 12	DAY 13	DAY 14
RAW SEWAGE FLOW	1,985	1,969	1,942	1,867	1,970	1,926	1,916
% of Design Flow	45.53%	45.16%	44.54%	42.82%	45.18%	44.17%	43.94%
Influent BOD (mg/L)		113.0					
Primary BOD (mg/L)							
Secondary BOD (mg/L)		9.0					
% PRIMARY REMOVAL							
% SECONDARY REMOVAL		92.0					
Influent SS (mg/L)		161.0					
Primary SS (mg/L)							
Secondary SS (mg/L)		10.0					
% PRIMARY REMOVAL							
% SECONDARY REMOVAL		93.8					
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)		0.5					
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)		49.5					
Primary TKN (mg/L)							
Secondary TKN (mg/L)		2.6					
% PRIMARY REMOVAL							
% SECONDARY REMOVAL		94.7					
Influent Total P (mg/L)		7.1					
Primary Total P (mg/L)							
Secondary Total P (mg/L)		0.6					
% PRIMARY REMOVAL							
% SECONDARY REMOVAL		91.8					

OPERATIONAL EVALUATION FOR: MOORE TOWNSHIP (CORRUNA) WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: February 7,1987
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: 4360 m3/d

PARAMETER	SAMPLING PERIOD						
	DAY 15	DAY 16	DAY 17	DAY 18	DAY 19	DAY 20	DAY 21
RAW SEWAGE FLOW	2,327	1,869	2,112	1,990	1,965	2,148	2,038
% of Design Flow	53.37%	42.87%	48.44%	45.64%	45.07%	49.27%	46.74%
Influent BOD (mg/L)			120.0				
Primary BOD (mg/L)							
Secondary BOD (mg/L)			7.0				
% PRIMARY REMOVAL							
% SECONDARY REMOVAL			94.2				
Influent SS (mg/L)			198.0				
Primary SS (mg/L)							
Secondary SS (mg/L)			12.0				
% PRIMARY REMOVAL							
% SECONDARY REMOVAL			93.9				
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)			1.5				
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)			50.5				
Primary TKN (mg/L)							
Secondary TKN (mg/L)			2.7				
% PRIMARY REMOVAL							
% SECONDARY REMOVAL			94.7				
Influent Total P (mg/L)			7.8				
Primary Total P (mg/L)							
Secondary Total P (mg/L)			0.4				
% PRIMARY REMOVAL							
% SECONDARY REMOVAL			94.9				

PLANT NAME : Moore (Corunnal)
PLANT TYPE : Secondary

SAMPLING TYPE : Raw Sewage
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	PLANT MIN. CONC. > - DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0	189.00	442.00	5	5	100.0	267	266	99.6	255.92	140.23	1.44	1.93	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0	374.00	644.00	5	5	100.0	260	258	99.2	469.04	287.75	1.26	1.82	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0	37.40	59.40	5	5	100.0	271	271	100.0	43.14	22.39	1.21	1.81	100.0
NNHTFR	AMMONIUM,TOTAL FILT.REAC.	mg/L	0	22.60	24.50	5	5	100.0	275	274	99.6	23.63	15.37	1.03	1.69	100.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0	34.30	40.60	5	5	100.0	273	273	100.0	37.03	25.44	1.07	1.47	100.0
PH	(-LOG(H+(CONCN))		0	6.58	6.78	5	5	100.0	275	275	100.0	6.69	6.90	1.01	1.05	100.0
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/L	0	6.93	10.50	6	6	100.0	268	268	100.0	8.57	5.18	1.16	1.51	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0	159.00	293.00	5	5	100.0	267	266	99.6	211.57	126.88	1.31	1.93	100.0
NNOTFR	NITRATES,TOTAL FILT.REAC.	mg/L	0	0.25	0.45	5	3	60.0	275	28	10.2	0.17	0.05	2.39	2.33	32.4
NNO2FR	NITRITE,FILT. REACT.	mg/L	0	0.03	0.03	5	1	20.0	271	58	21.4	0.01	0.01	1.68	2.98	51.4
METALS																
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	290.00	1900.00	6	6	100.0	322	306	95.0	980.00	1000.10	1.89	2.65	97.3
CUUT	COPPER,UNFILT.TOTAL	ug/L	0	80.00	80.00	1	1	100.0	49	48	98.0	80.00	110.60	0.00	2.28	97.1
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	170.00	210.00	6	6	100.0	319	318	99.7	190.00	370.70	1.07	2.14	100.0
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	120.00	350.00	6	6	100.0	322	315	97.8	180.00	211.00	1.53	2.94	100.0
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	0.19	0.28	6	5	83.3	283	274	96.8	0.28	0.23	1.91	2.11	100.0
CDUT	CADMIUM,UNFILT.TOTAL	ug/L	0	10.00	20.00	6	2	33.3	322	76	23.6	10.00	6.50	2.55	2.09	70.3
COUT	COBALT,UNFILT.TOTAL	ug/L	0	30.00	60.00	6	2	33.3	322	82	25.5	20.00	9.30	3.40	2.31	83.8
AGUT	SILVER,UNFILT.TOTAL	ug/L	0	10.00	10.00	6	1	16.7	321	82	25.6	10.00	10.40	1.94	2.55	75.7
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	40.00	40.00	6	1	16.7	322	237	73.6	20.00	51.10	2.10	3.44	89.2
PBUT	LEAD,UNFILT.TOTAL	ug/L	0	100.00	100.00	6	1	16.7	322	57	17.7	60.00	59.50	1.35	1.86	51.4
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PMPHEN	PHENOL	ug/L	2	26.50	116.40	5	5	100.0	275	118	42.9	50.19	14.52	1.76	2.46	78.4
PMMCRE	M-CRESOL	ug/L	1	22.30	140.90	5	4	80.0	275	167	60.7	44.94	25.59	3.40	3.45	86.5
PESTICIDES,HERBICIDES,PCBS																
P1BHCG	GAMMA-BHC(HEXCHLORCYCLHEXANE)	ug/L	2	0.03	0.10	5	5	100.0	276	143	51.8	0.06	0.02	1.59	2.29	94.6
P324D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	0.13	0.23	5	5	100.0	276	214	77.5	0.17	0.13	1.30	3.72	100.0
X2HCB	HEXACHLOROBENZENE	ug/L	2	0.03	0.06	5	4	80.0	276	11	4.0	0.03	0.01	2.01	1.39	18.9
P1PCBT	PCB, TOTAL	ug/L	2	0.16	4.50	5	3	60.0	276	42	15.2	0.23	0.06	7.38	2.31	46.0
P3245T	2,4,5-TRICLORPHENOXYACETIC ACID	ug/L	3	0.15	0.20	5	3	60.0	276	22	8.0	0.10	0.06	1.96	1.60	37.8
P3SILV	SILVEX	ug/L	3	0.11	0.11	5	1	20.0	276	28	10.1	0.06	0.06	1.42	1.68	40.5
VOLATILES ORGANIC COMPOUNDS																
X1TRIC	TRICHLOROETHYLENE	ug/L	1	77.00	220.00	5	5	100.0	274	15	5.5	123.58	22.59	1.70	1.82	16.2
X1TETR	TETRACHLOROETHYLENE	ug/L	1	3000.00	3000.00	5	1	20.0	274	12	4.4	54.48	21.51	9.40	1.53	18.9

PLANT NAME : Moore (Corunna)
PLANT TYPE : Secondary

SAMPLING TYPE : Final Effluent
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	STD. FOR SURFACE WATER	STD. REF.	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET.	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																		
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0		-	35.70	45.00	5	5	100.0	213	211	99.1	40.81	21.22	1.10	2.07	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0		-	28.00	72.00	5	5	100.0	213	211	99.1	42.54	52.80	1.55	1.83	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0		-	6.00	8.60	5	5	100.0	220	220	100.0	6.82	8.09	1.15	1.60	100.0
NNO2FR	NITRITE,FIL.T. REACT.	mg/L	0		-	0.06	0.30	5	5	100.0	220	194	88.2	0.10	0.22	1.88	5.95	96.4
NNOTPR	NITRATES,TOTAL FIL.T.REAC.	mg/L	0		-	13.80	16.00	5	5	100.0	224	186	83.0	15.16	2.33	1.06	7.75	96.4
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0		-	1.50	2.10	5	5	100.0	222	222	100.0	1.53	7.97	1.23	2.71	100.0
PH	(-LOG(H+(CONCN))		0		-	6.61	6.83	5	5	100.0	224	224	100.0	6.68	7.10	1.01	1.05	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0		-	9.60	13.20	5	5	100.0	220	219	99.6	10.89	10.12	1.13	2.00	100.0
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/L	0		-	0.43	0.61	6	5	83.3	211	206	97.6	0.43	0.68	1.34	1.97	100.0
NNHTPR	AMMONIUM,TOTAL FIL.T.REAC.	mg/L	0		-	0.40	1.10	5	2	40.0	223	204	91.5	0.09	3.90	6.24	6.98	100.0
METALS																		
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	75.00	ONT-MOE	830.00	1300.00	6	6	100.0	264	196	74.2	1000.00	101.70	1.19	3.72	96.4
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	3750.00	ONT-MOE	110.00	220.00	6	6	100.0	267	267	100.0	150.00	340.90	1.28	2.14	100.0
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	30.00	ONT-MOE	30.00	50.00	6	6	100.0	267	262	98.1	40.00	53.30	1.18	2.48	100.0
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	0.20	ONT-MOE	0.01	0.02	6	5	83.3	233	220	94.4	0.03	0.03	4.05	2.62	100.0
NIUT	NICKEL,UNFILT.TOTAL	ug/L	0	25.00	ONT-MOE	20.00	20.00	6	2	33.3	267	171	64.0	10.00	22.10	3.61	3.60	85.7
CCNFUR	CYANIDE-FREE,UNFILT.REAC.	ug/L	0	5.00	ONT-MOE	10.00	10.00	5	1	20.0	222	42	18.9	0.00	1.30	3.04	3.68	46.4
CDUT	CADMIUM,UNFILT.TOTAL	ug/L	0	0.20	ONT-MOE	0.00	0.00	6	1	16.7	267	65	24.3	0.00	2.10	3.09	2.07	71.4
COUT	COBALT,UNFILT.TOTAL	ug/L	0	5.00	NYS-STD	10.00	10.00	6	1	16.7	266	65	24.4	10.00	6.40	1.94	1.54	82.1
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	100.00	ONT-MOE	10.00	10.00	6	1	16.7	267	137	51.3	10.00	9.00	1.94	2.00	89.3
PBUT	LEAD,UNFILT.TOTAL	ug/L	0	25.00	ONT-MOE	30.00	30.00	6	1	16.7	267	25	9.4	20.00	16.50	1.37	1.48	60.7
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																		
PMBBP	BUTYLBENZYLPHTHALATE	ug/L	1	50.00	NYS-GUL	25.00	25.00	5	1	20.0	228	3	1.3	1.90	1.09	4.22	1.59	7.1
PESTICIDES,HERBICIDES,PCBS																		
P24D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	4.00	ONT-MOE	0.08	0.39	5	5	100.0	227	177	78.0	0.15	0.08	1.97	4.71	100.0
P1BHCG	GAMMA-BHC(HEXACHLORCYCLHEXANE)	ug/L	2	0.06	ONT-MOE	0.04	0.06	5	4	80.0	227	157	69.2	0.03	0.02	2.76	2.48	96.4
P245T	2,4,5-TRICLORPHENOXYACETIC ACID	ug/L	3		-	0.07	0.60	5	4	80.0	227	25	11.0	0.11	0.03	3.50	2.27	42.9
P58ILV	SILVEX	ug/L	3		-	0.05	0.11	5	3	60.0	227	23	10.1	0.05	0.03	2.05	1.83	50.0
P1PCBT	PCB, TOTAL	ug/L	2	0.00	ONT-MOE	0.04	0.04	5	1	20.0	227	9	4.0	0.02	0.02	1.36	1.40	28.6
VOLATILES ORGANIC COMPOUNDS																		
X1TETR	TETRACHLOROETHYLENE	ug/L	1	0.70	NYS-GUL	14.00	84.00	5	5	100.0	224	18	8.0	29.77	1.18	2.04	1.93	32.1
X1CHLO	CHLOROFORM	ug/L	1	0.20	NYS-STD	6.60	6.60	5	1	20.0	224	37	16.5	1.46	1.37	2.33	2.18	64.3

PLANT NAME : Moore (Corunna)
PLANT TYPE : Secondary

SAMPLING TYPE : Raw Sludge
SAMPLE FORM : Dry Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS (DRY WEIGHT)	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
COD	CHEMICAL OXYGEN DEMAND	mg/kg	0	973254.09	973254.09	1	1	100.0	45	45	100.0	973254.09	892221.45	0.00	3.19	100.0
NNHTPR	AMMONIUM,TOTAL FIL.T.REAC.	mg/kg	0	3684.99	3684.99	1	1	100.0	48	47	97.9	3684.99	5911.32	0.00	4.59	100.0
NNOTPR	NITRATES,TOTAL FIL.T.REAC.	mg/kg	0	37.15	37.15	1	1	100.0	48	43	89.6	37.15	25.44	0.00	2.21	93.9
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/kg	0	61367.01	61367.01	1	1	100.0	51	51	100.0	61367.01	36897.85	0.00	2.98	100.0
PH	(-LOG(H+(CONCN))	mg/kg	0	6.95	6.95	1	1	100.0	49	49	100.0	6.95	6.05	0.00	1.10	100.0
PPUT	PHOSPHORUS,UNFIL.T.TOTAL	mg/kg	0	68202.08	68202.08	1	1	100.0	42	42	100.0	68202.08	20347.70	0.00	4.43	100.0
RST	RESIDUE, TOTAL	mg/kg	0	6730.00	6730.00	1	1	100.0	51	51	100.0	6730.00	32783.51	0.00	1.81	100.0
RSTLOI	RESIDUE,TOT.LOSS ON IGNI.	mg/kg	0	4370.00	4370.00	1	1	100.0	51	51	100.0	4370.00	20803.05	0.00	1.77	100.0
METALS																
AGUT	SILVER,UNFIL.T.TOTAL	mg/kg	0	25.26	25.26	1	1	100.0	45	40	88.9	25.26	30.17	0.00	2.61	84.4
ALUT	ALUMINUM,UNFIL.T.TOTAL	mg/kg	0	57949.48	57949.48	1	1	100.0	51	51	100.0	57949.48	9835.74	0.00	2.51	100.0
ASUT	ARSENIC,UNFIL.T.TOTAL	mg/kg	0	7.43	7.43	1	1	100.0	51	50	98.0	7.43	6.13	0.00	2.01	97.1
COUT	COBALT,UNFIL.T.TOTAL	mg/kg	0	34.18	34.18	1	1	100.0	41	30	73.2	34.18	9.29	0.00	4.69	73.3
CRUT	CHROMIUM,UNFIL.T.TOTAL	mg/kg	0	71.32	71.32	1	1	100.0	51	50	98.0	71.32	301.43	0.00	3.68	97.1
CUUT	COPPER,UNFIL.T.TOTAL	mg/kg	0	322.44	322.44	1	1	100.0	46	46	100.0	322.44	606.31	0.00	1.72	100.0
NIUT	NICKEL,UNFIL.T.TOTAL	mg/kg	0	50.52	50.52	1	1	100.0	46	44	95.7	50.52	59.17	0.00	2.90	93.3
SEUT	SELENIUM,UNFIL.T.TOTAL	mg/kg	0	4.46	4.46	1	1	100.0	50	48	96.0	4.46	3.04	0.00	1.93	93.9
SRUT	STRONTIUM,UNFIL.T.TOTAL	mg/kg	0	138.19	138.19	1	1	100.0	51	51	100.0	138.19	231.70	0.00	1.97	100.0
ZNUT	ZINC,UNFIL.T.TOTAL	mg/kg	0	401.19	401.19	1	1	100.0	51	51	100.0	401.19	905.39	0.00	2.39	100.0
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PMBBP	BUTYLBENZYLPHTHALATE	ug/kg	1	35958.40	35958.40	1	1	100.0	51	4	7.8	35958.40	3445.60	0.00	2.25	11.8
PESTICIDES,HERBICIDES,PCBS																
P1BHCG	GAMMA-BHC(HEXACHLORCYCLOHEXANE)	ug/kg	2	59.40	59.40	1	1	100.0	51	28	54.9	59.40	8.90	0.00	2.69	67.7
P24D	2,4-DICHLOROPHENOXYACETIC ACID	ug/kg	3	86.20	86.20	1	1	100.0	51	38	74.5	86.20	93.20	0.00	6.50	82.3
X2HCB	HEXACHLOROBENZENE	ug/kg	2	44.60	44.60	1	1	100.0	51	17	33.3	44.60	5.60	0.00	2.65	38.2

PLANT NAME : Moore (Corunna)
PLANT TYPE : Secondary

SAMPLING TYPE : Treated Sludge
SAMPLE FORM : Dry Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS (DRY WEIGHT)	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
COD	CHEMICAL OXYGEN DEMAND	mg/kg	0	2483375.96	2483375.96	1	1	100.0	36	36	100.0	2483375.96	508097.94	0.00	4.65	100.0
NNITPR	AMMONIUM,TOTAL FIL.T.REAC.	mg/kg	0	5601.02	5601.02	1	1	100.0	25	25	100.0	5601.02	17658.28	0.00	2.92	100.0
NNOTPR	NITRATES,TOTAL FIL.T.REAC.	mg/kg	0	23.02	23.02	1	1	100.0	26	23	88.5	23.02	42.68	0.00	2.29	95.0
NNTKUR	NITROGEN-TOT-KJEL.,UNF.TOT	mg/kg	0	57544.76	57544.76	1	1	100.0	49	49	100.0	57544.76	38494.12	0.00	1.77	100.0
PH	(-LOG(H+(CONCN))	mg/kg	0	6.37	6.37	1	1	100.0	47	47	100.0	6.37	7.17	0.00	1.09	100.0
PHENOL	PHENOLICS (4AAP)	mg/kg	0	69.05	69.05	1	1	100.0	49	41	83.7	69.05	43.05	0.00	3.14	87.9
PPUT	PHOSPHORUS,UNFIL.T.TOTAL.	mg/kg	0	40409.21	40409.21	1	1	100.0	43	43	100.0	40409.21	76638.67	0.00	6.91	100.0
RST	RESIDUE, TOTAL	mg/kg	0	39100.00	39100.00	1	1	100.0	50	50	100.0	39100.00	80434.04	0.00	3.23	100.0
RSTLOI	RESIDUE,TOT.LOSS ON IGNI.	mg/kg	0	26100.00	26100.00	1	1	100.0	50	50	100.0	26100.00	43379.33	0.00	3.19	100.0
METALS																
AGUT	SILVER,UNFIL.T.TOTAL.	mg/kg	0	2.30	2.30	1	1	100.0	44	44	100.0	2.30	37.78	0.00	2.33	100.0
ALUT	ALUMINUM,UNFIL.T.TOTAL.	mg/kg	0	69053.71	69053.71	1	1	100.0	50	50	100.0	69053.71	10715.94	0.00	2.82	100.0
ASUT	ARSENIC,UNFIL.T.TOTAL.	mg/kg	0	5.88	5.88	1	1	100.0	50	49	98.0	5.88	5.40	0.00	2.06	97.1
CDUT	CADMIUM,UNFIL.T.TOTAL.	mg/kg	0	7.93	7.93	1	1	100.0	45	41	91.1	7.93	10.47	0.00	3.98	90.3
CRUT	CHROMIUM,UNFIL.T.TOTAL.	mg/kg	0	69.05	69.05	1	1	100.0	50	50	100.0	69.05	333.06	0.00	3.59	100.0
CUUT	COPPER,UNFIL.T.TOTAL.	mg/kg	0	379.54	379.54	1	1	100.0	45	45	100.0	379.54	732.24	0.00	2.16	100.0
HGUT	MERCURY,UNFIL.T.TOTAL.	mg/kg	0	0.77	0.77	1	1	100.0	50	49	98.0	0.77	3.24	0.00	2.04	97.1
MOUT	MOLYBDENUM,UNFIL.T.TOTAL.	mg/kg	0	16.37	16.37	1	1	100.0	34	23	67.7	16.37	6.41	0.00	2.84	69.2
NIUT	NICKEL,UNFIL.T.TOTAL.	mg/kg	0	14.83	14.83	1	1	100.0	45	42	93.3	14.83	72.95	0.00	2.95	90.0
PBUT	LEAD,UNFIL.T.TOTAL.	mg/kg	0	79.28	79.28	1	1	100.0	50	49	98.0	79.28	196.62	0.00	2.46	97.1
SEUT	SELENIUM,UNFIL.T.TOTAL.	mg/kg	0	3.32	3.32	1	1	100.0	50	48	96.0	3.32	2.67	0.00	2.98	97.1
SRUT	STRONTIUM,UNFIL.T.TOTAL.	mg/kg	0	156.01	156.01	1	1	100.0	50	50	100.0	156.01	240.93	0.00	2.54	100.0
ZNUT	ZINC,UNFIL.T.TOTAL.	mg/kg	0	434.78	434.78	1	1	100.0	50	50	100.0	434.78	988.90	0.00	2.57	100.0
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PMMCRE	M-CRESOL	ug/kg	1	166240.40	166240.40	1	1	100.0	50	15	30.0	166240.40	5281.80	0.00	8.20	35.3
PESTICIDES,HERBICIDES,PCBS																
P1BHCG	GAMMA-BHC(HEXACHLORCYCLOHEXANE)	ug/kg	2	15.30	15.30	1	1	100.0	50	12	24.0	15.30	5.70	0.00	3.13	35.3
P1CHLA	ALPHA-CHLORDANE	ug/kg	1	5.10	5.10	1	1	100.0	50	22	44.0	5.10	6.50	0.00	2.41	55.9
P245T	2,4,5-TRICHLORPHENOXYACETIC ACID	ug/kg	3	28.10	28.10	1	1	100.0	50	16	32.0	28.10	84.40	0.00	3.13	41.2
P24D	2,4-DICHLOROPHENOXYACETIC ACID	ug/kg	3	11.30	11.30	1	1	100.0	50	25	50.0	11.30	75.00	0.00	5.81	64.7
X2HCB	HEXACHLOROBENZENE	ug/kg	2	46.00	46.00	1	1	100.0	50	21	42.0	46.00	7.00	0.00	2.96	55.9

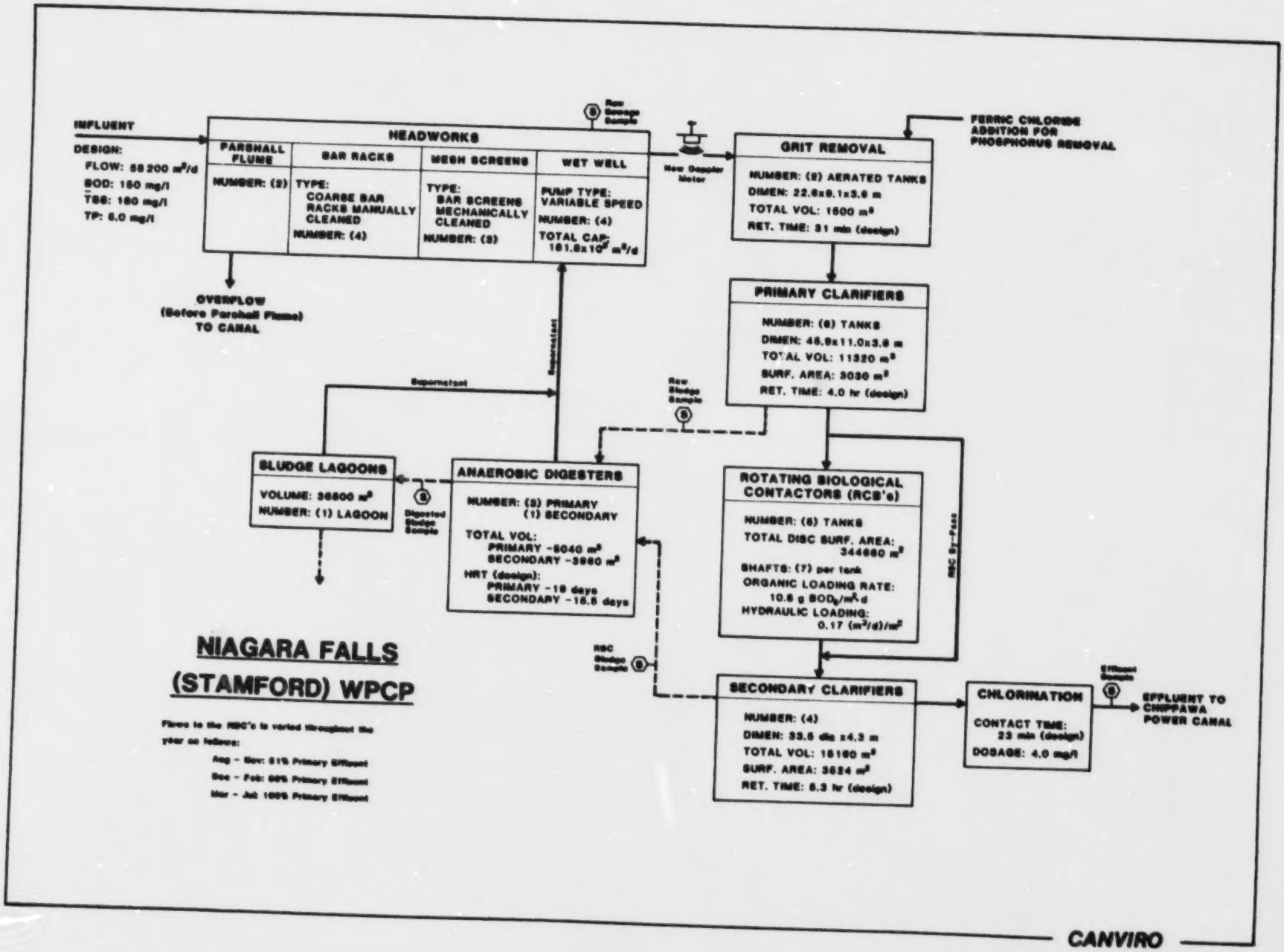
Sub-Appendix A-17

Niagara Falls (Stamford) WPCP

Contents:

- Plant Schematic with Design Characteristics
- Annual Data Review (1981 - 1986 Plant Performance)
- Sources of Municipal Water Pollution Control Plant Raw Sewage
- Operational Evaluation for Niagara Falls (Stamford) WPCP
- Analytical Data

(KIR18/28A)


INFLUENT
DESIGN:
FLOW: 58 200 m³/d
BOD: 150 mg/l
TSS: 160 mg/l
TP: 6.0 mg/l
HEADWORKS
PARSHALL FLUME
NUMBER: (2)
BAR RACKS
TYPE: COARSE BAR RACKS MANUALLY CLEANED
NUMBER: (4)
MESH SCREENS
TYPE: BAR SCREENS MECHANICALLY CLEANED
NUMBER: (3)
WET WELL
PUMP TYPE: VARIABLE SPEED
NUMBER: (4)
TOTAL CAP: 181.8x10³ m³/d
Raw Sewage Sample
New Doppler Meter
FERRIC CHLORIDE ADDITION FOR PHOSPHORUS REMOVAL
GRIT REMOVAL
NUMBER: (2) AERATED TANKS
DIMEN: 22.6x9.1x3.6 m
TOTAL VOL: 1600 m³
RET. TIME: 31 min (design)
OVERFLOW (Before Parshall Flume) TO CANAL
PRIMARY CLARIFIERS
NUMBER: (6) TANKS
DIMEN: 46.9x11.0x3.6 m
TOTAL VOL: 11320 m³
SURF. AREA: 3030 m²
RET. TIME: 4.0 hr (design)
Supernatant
Supernatant
Raw Sludge Sample
SLUDGE LAGOONS
VOLUME: 36800 m³
NUMBER: (1) LAGOON
Digested Sludge Sample
ANAEROBIC DIGESTERS
NUMBER: (3) PRIMARY (1) SECONDARY
TOTAL VOL: PRIMARY -5040 m³ SECONDARY -3960 m³
HRT (design): PRIMARY -19 days SECONDARY -15.5 days
ROTATING BIOLOGICAL CONTACTORS (RCB's)
NUMBER: (6) TANKS
TOTAL DISC SURF. AREA: 344660 m²
SHAFTS: (7) per tank
ORGANIC LOADING RATE: 10.8 g $BOD_5/m^2 \cdot d$
HYDRAULIC LOADING: 0.17 $(m^3/d)/m^2$
RBC By-Pass
RBC Sludge Sample
SECONDARY CLARIFIERS
NUMBER: (4)
DIMEN: 33.6 dia x4.3 m
TOTAL VOL: 15160 m³
SURF. AREA: 3624 m²
RET. TIME: 6.3 hr (design)
CHLORINATION
CONTACT TIME: 23 min (design)
DOSAGE: 4.0 mg/l
Effluent Sample
EFFLUENT TO CHIPPAWA POWER CANAL
NIAGARA FALLS (STAMFORD) WPCP
Flows to the RBC's is varied throughout the year as follows:
Aug - Nov: 81% Primary Effluent
Dec - Feb: 66% Primary Effluent
Mar - Jul: 100% Primary Effluent
CANVIRO

STAMFORD WPCP
Primary
Phosphorus Removal - Continuous
Capacity - 50.189 10(3)m3/day

PARAMETER	1981	1982	1983	1984	1985	5 YEAR AVERAGE 81-85
Avg. Daily Flow (1000 m3/day)	44.57	51.06	56.24	56.15	57.06	53.18
BOD5 - Influent (mg/L)	102.00	101.00	100.00	86.42	89.00	95.68
BOD5 - Effluent (mg/L)	27.00	42.00	50.00	38.00	31.32	37.66
Annual BOD5 Significantly Different from Mean Annual Average BOD5?	I.D.	I.D.	I.D.	I.D.	I.D.	
TSS - Influent (mg/L)	164.00	179.00	173.00	187.42	99.67	168.62
TSS - Effluent (mg/L)	26.00	26.00	22.00	29.67	23.77	25.49
Annual TSS Significantly Different from Mean Annual Average TSS?	I.D.	I.D.	I.D.	I.D.	I.D.	
Total P - Influent (mg/L)	4.00	4.40	5.30	4.37	3.14	4.40
Total P - Effluent (mg/L)	1.00	0.90	1.00	0.63	0.46	0.78
Annual TP Significantly Different from Mean Annual Average TP?	I.D.	I.D.	I.D.	I.D.	I.D.	
TP in Compliance?	Y	Y	Y	Y	Y	Y

I.D. - Insufficient Data

R

SOURCES OF MUNICIPAL WATER POLLUTION CONTROL PLANT RAW SEWAGE

GENERAL DESCRIPTION OF WATER POLLUTION CONTROL PLANT (WPCP)

NAME OF WPCP	STAMFORD (NIAGARA FALLS) WPCP
WORKS NUMBER	120001363
TREATMENT TYPE	PRIMARY PHOSPHORUS REMOVAL CONTINUOUS
DESIGN CAPACITY (1000 m3/d)	58.189
1986 AVERAGE DAY FLOW (1000 m3/d)	56.706
POPULATION SERVED	67835

% OF TOTAL FLOW ATTRIBUTED TO:

INDUSTRIAL SOURCES (%)	18
COMMERCIAL SOURCES (%) (Population x 0.0757)	9
RESIDENTIAL SOURCES (%) (Population x 0.175)	21
UNACCOUNTED FOR, INCL. INFILTRATION (100-% Contributed from industrial, commercial and residential sources)	52

PROFILE OF INDUSTRIES IN CATCHMENT

TOTAL NO OF INDUSTRIES	152
INDUSTRIES WITH WATER	107
NO OF SIC CATEGORIES	42

DESCRIPTION OF THE TOP 5 INDUSTRIES DISCHARGED TO THE WPCP
(BASED ON WATER USE DATA)

DESCRIPTION	SIC	NUMBER OF COMPANIES
STONE, CLAY MINERAL PRODUCTS	3200-3299	9
FRUIT AND VEGETABLES	2032-2038	4
FERTILIZER MFG	2873-2875	1
BEVERAGES	2082-2087	2
PHOSPHATE MFG	2819-2819	1

R

OPERATIONAL EVALUATION FOR: N I A G A R A F A L L S W P C P

TREATMENT FACILITY: Other (RBC's)
PERIOD ENDING: March 29, 1987
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: 58,200 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
RAW SEWAGE FLOW	53,485	45,875	46,852	45,784	45,916	44,097	42,279
% of Design Flow	91.90%	78.82%	80.50%	78.67%	78.89%	75.77%	72.64%
Influent BOD (mg/L)						40.0	
Primary BOD (mg/L)						29.0	
Secondary BOD (mg/L)						10.0	
% PRIMARY REMOVAL						27.5	
% SECONDARY REMOVAL						75.0	
Influent SS (mg/L)	56.0	56.0	66.0	128.0	108.0	97.0	56.0
Primary SS (mg/L)	41.0	41.0	49.0	51.0	56.0	52.0	47.0
Secondary SS (mg/L)	13.0	19.0	19.0	18.0	13.0	9.0	11.0
% PRIMARY REMOVAL	26.8	26.8	25.8	60.2	48.1	46.4	16.1
% SECONDARY REMOVAL	76.8	66.1	71.2	85.9	88.0	90.7	80.4
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)						4.90	
Primary Total P (mg/L)						2.96	
Secondary Total P (mg/L)						1.04	
% PRIMARY REMOVAL						39.59	
% SECONDARY REMOVAL						78.78	

OPERATIONAL EVALUATION FOR: N I A G A R A F A L L S W P C P

TREATMENT FACILITY: Other (RBC's)
PERIOD ENDING: March 29, 1987
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: 58,200 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 8	DAY 9	DAY 10	DAY 11	DAY 12	DAY 13	DAY 14
RAW SEWAGE FLOW	44,552	43,642	43,188	40,915	43,961	41,824	40,915
% of Design Flow	76.55%	74.99%	74.21%	70.30%	75.53%	71.86%	70.30%
Influent BOD (mg/L)							
Primary BOD (mg/L)							
Secondary BOD (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent SS (mg/L)	95.0	84.0	66.0	119.0	102.0	157.0	121.0
Primary SS (mg/L)	42.0	59.0	50.0	43.0	71.0	57.0	42.0
Secondary SS (mg/L)	13.0	6.0	11.0	13.0	10.0	10.0	13.0
% PRIMARY REMOVAL	55.79	29.76	24.24	63.87	30.39	63.69	65.29
% SECONDARY REMOVAL	86.32	92.86	83.33	89.08	90.20	93.63	89.26
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)						4.54	
Primary Total P (mg/L)						3.65	
Secondary Total P (mg/L)						0.95	
% PRIMARY REMOVAL						19.60	
% SECONDARY REMOVAL						79.07	

OPERATIONAL EVALUATION FOR: NIAGARA FALLS WPCP

TREATMENT FACILITY: Other (RBC's)
PERIOD ENDING: March 29, 1987
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: 58,200 m3/d

PARAMETER	SAMPLING PERIOD						
	DAY 15	DAY 16	DAY 17	DAY 18	DAY 19	DAY 20	DAY 21
RAW SEWAGE FLOW	41,569	41,179	72,737	47,734	42,597		
% of Design Flow	71.42%	70.75%	124.98%	82.02%	73.19%		
Influent BOD (mg/L)							
Primary BOD (mg/L)							
Secondary BOD (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent SS (mg/L)	98.0	101.0	206.0	184.0	96.0		
Primary SS (mg/L)	51.0	56.0	50.0	62.0	58.0		
Secondary SS (mg/L)	13.0	10.0	5.0	12.0	15.0		
% PRIMARY REMOVAL	47.96	44.55	75.73	66.30	39.58		
% SECONDARY REMOVAL	86.73	90.10	97.57	93.48	84.38		
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)							
Primary Total P (mg/L)							
Secondary Total P (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							

OPERATIONAL EVALUATION FOR: N I A G A R A F A L L S W P C P

TREATMENT FACILITY: Other (RBC's)
PERIOD ENDING: May 29, 1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 58,200 m3/d

PARAMETER	PRE-SAMPLING PERIOD DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
RAW SEWAGE FLOW	47,848	44,824	45,461	55,917	60,140	48,116	46,766
% of Design Flow	82.21%	77.02%	78.11%	96.08%	103.33%	82.67%	80.35%
Influent BOD (mg/L)						24.0	
Primary BOD (mg/L)						20.0	
Secondary BOD (mg/L)						17.0	
% PRIMARY REMOVAL						16.7	
% SECONDARY REMOVAL						29.2	
Influent SS (mg/L)	125.0	110.0	70.0	129.0	137.0	149.0	98.0
Primary SS (mg/L)	59.0	57.0	32.0	64.0	48.0	51.0	51.0
Secondary SS (mg/L)	11.0	13.0	10.0	12.0	27.0	13.0	11.0
% PRIMARY REMOVAL	52.8	48.2	54.3	50.4	65.0	65.8	48.0
% SECONDARY REMOVAL	91.2	88.2	85.7	90.7	80.3	91.3	88.8
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)						4.22	
Primary Total P (mg/L)						2.82	
Secondary Total P (mg/L)						0.51	
% PRIMARY REMOVAL						33.18	
% SECONDARY REMOVAL						87.91	

OPERATIONAL EVALUATION FOR: NIAGARA FALLS NPCP

TREATMENT FACILITY: Other (RBC's)
PERIOD ENDING: May 29, 1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 58,200 m3/d

PARAMETER	PRE-SAMPLING PERIOD						
	DAY 8	DAY 9	DAY 10	DAY 11	DAY 12	DAY 13	DAY 14
RAW SEWAGE FLOW	55,226	46,884	46,652	45,979	61,709	50,002	47,784
% of Design Flow	94.89%	80.56%	80.16%	79.00%	106.03%	85.91%	82.10%
Influent BOD (mg/L)						42.0	
Primary BOD (mg/L)						37.0	
Secondary BOD (mg/L)						19.0	
% PRIMARY REMOVAL						11.9	
% SECONDARY REMOVAL						54.8	
Influent SS (mg/L)	137.0	129.0	101.0	87.0	262.0	182.0	78.0
Primary SS (mg/L)	39.0	50.0	53.0	64.0	83.0	96.0	56.0
Secondary SS (mg/L)	13.0	18.0	12.0	21.0	17.0	18.0	14.0
% PRIMARY REMOVAL	71.5	61.2	47.5	26.4	68.3	47.3	28.2
% SECONDARY REMOVAL	90.5	86.0	88.1	75.9	93.5	90.1	82.1
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)						5.00	
Primary Total P (mg/L)						3.42	
Secondary Total P (mg/L)						0.97	
% PRIMARY REMOVAL						31.60	
% SECONDARY REMOVAL						80.60	

OPERATIONAL EVALUATION FOR: NIAGARA FALLS WPCP

TREATMENT FACILITY: Other (RBC's)
PERIOD ENDING: May 29, 1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 58,200 m3/d

PARAMETER	SAMPLING PERIOD						
	DAY 15	DAY 16	DAY 17	DAY 18	DAY 19	DAY 20	DAY 21
RAW SEWAGE FLOW	48,948	45,543	49,061	46,443	46,747		
% of Design Flow	84.10%	78.25%	84.30%	79.80%	80.32%		
Influent BOD (mg/L)							
Primary BOD (mg/L)							
Secondary BOD (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent SS (mg/L)	128.0	100.0	93.0	108.0	80.0		
Primary SS (mg/L)	50.0	59.0	59.0	47.0	56.0		
Secondary SS (mg/L)	14.0	22.0	22.0	13.0	13.0		
% PRIMARY REMOVAL	60.9	41.0	36.6	56.5	30.0		
% SECONDARY REMOVAL	89.1	78.0	76.3	88.0	83.8		
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)							
Primary Total P (mg/L)							
Secondary Total P (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							

PLANT NAME : Niagara Falls (Stamford)
PLANT TYPE : Secondary

SAMPLING TYPE : Raw Sewage
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0	41.70	150.00	10	10	100.0	267	266	99.6	99.45	140.23	1.47	1.93	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0	134.00	298.00	10	10	100.0	260	258	99.2	207.89	287.75	1.26	1.82	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0	16.00	26.50	10	10	100.0	271	271	100.0	19.57	22.39	1.13	1.81	100.0
NNHTPR	AMMONIUM,TOTAL FILT.REAC.	mg/L	0	12.20	15.70	10	10	100.0	275	274	99.6	14.01	15.37	1.08	1.69	100.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0	18.50	30.00	9	9	100.0	273	273	100.0	23.55	25.44	1.18	1.47	100.0
PH	(-LOG(H+(CONCN))		0	6.47	6.87	10	10	100.0	275	275	100.0	6.72	6.90	1.02	1.05	100.0
PPUT	PHOSPHORUS,UNFILT.TOTAL.	mg/L	0	3.05	5.22	6	6	100.0	248	248	100.0	4.23	5.18	1.22	1.51	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0	45.30	182.00	10	10	100.0	267	266	99.6	82.76	126.88	1.62	1.93	100.0
RSPLOI	RESIDUE,PAR.LOSS ON IGNI.	mg/L	0	54.30	62.70	2	2	100.0	90	89	98.9	58.35	100.84	1.11	1.78	100.0
NNO2FR	NITRITE,FIL.T. RIACT.	mg/L	0	0.03	0.03	10	1	10.0	271	58	21.4	0.00	0.01	2.09	2.98	51.4
METALS																
CUUT	COPPER,UNFILT.TOTAL.	ug/L	0	40.00	50.00	2	2	100.0	49	48	98.0	40.00	110.60	1.12	2.28	97.1
HGUT	MERCURY,UNFILT.TOTAL.	ug/L	0	0.08	0.32	10	10	100.0	283	274	96.8	0.14	0.23	1.53	2.11	100.0
SRUT	STRONTIUM,UNFILT.TOTAL.	ug/L	0	210.00	320.00	12	12	100.0	319	318	99.7	250.00	370.70	1.15	2.14	100.0
ZNUT	ZINC,UNFILT.TOTAL.	ug/L	0	70.00	270.00	12	12	100.0	322	315	97.8	100.00	211.00	1.49	2.94	100.0
ALUT	ALUMINUM,UNFILT.TOTAL.	ug/L	0	260.00	3200.00	12	11	91.7	322	306	95.0	660.00	1000.10	2.32	2.65	97.3
COUT	COBALT,UNFILT.TOTAL.	ug/L	0	40.00	60.00	12	4	33.3	322	82	25.5	10.00	9.30	2.95	2.31	83.8
AGUT	SILVER,UNFILT.TOTAL.	ug/L	0	10.00	20.00	12	2	16.7	321	82	25.6	10.00	10.40	2.11	2.55	75.7
CDUT	CADMIUM,UNFILT.TOTAL.	ug/L	0	10.00	20.00	12	2	16.7	322	76	23.6	10.00	6.50	1.50	2.09	70.3
CRUT	CHROMIUM,UNFILT.TOTAL.	ug/L	0	20.00	30.00	12	2	16.7	322	237	73.6	10.00	51.10	1.43	3.44	89.2
PBUT	LEAD,UNFILT.TOTAL.	ug/L	0	100.00	100.00	12	1	8.3	322	57	17.7	50.00	59.50	1.30	1.86	51.4
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PMPHEN	PHENOL	ug/L	2	16.20	36.80	10	7	70.0	275	118	42.9	17.17	14.52	1.88	2.46	78.4
PMMCRE	M-CRESOL	ug/L	1	29.40	141.70	10	5	50.0	275	167	60.7	20.99	25.59	3.16	3.45	86.5
PNPHEN	PHENANTHRENE	ug/L	1	11.90	17.20	10	3	30.0	275	7	2.6	6.90	5.17	1.69	1.35	10.8
PNNAPH	NAPHTHALENE	ug/L	1	11.60	11.60	10	1	10.0	275	16	5.8	5.44	5.37	1.30	1.47	21.6
PESTICIDES,HERBICIDES,PCBS																
P1BHCG	GAMMA-BHC(HEXCHLORCYCLHEXANE)	ug/L	2	0.03	0.09	10	7	70.0	276	143	51.8	0.03	0.02	2.38	2.29	94.6
P524D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	0.17	0.72	10	7	70.0	276	214	77.5	0.16	0.13	4.53	3.72	100.0
P1BHCA	ALPHA-BHC(HEXCHLORCYCLHEXANE)	ug/L	1	0.05	0.09	10	3	30.0	276	16	5.8	0.02	0.01	2.49	1.50	18.9
P1CHLA	ALPHA-CHLORDANE	ug/L	1	0.03	0.03	10	1	10.0	276	7	2.5	0.01	0.01	1.42	1.46	13.5
P1DMDT	METHOXYCHLOR	ug/L	1	0.31	0.31	10	1	10.0	276	47	17.0	0.06	0.08	1.78	3.14	43.2
P1PPDE	PP-DDE	ug/L	1	0.02	0.02	10	1	10.0	276	15	5.4	0.01	0.01	1.25	1.74	24.3
P245T	2,4,5-TRICLORPHENOXYACETIC ACID	ug/L	3	0.10	0.10	10	1	10.0	276	22	8.0	0.05	0.06	1.25	1.60	37.8
X2124	1,2,4-TRICHLOROBENZENE	ug/L	3	0.35	0.35	10	1	10.0	276	35	12.7	0.01	0.01	3.08	2.48	40.5
X2HCE	HEXACHLOROETHANE	ug/L	3	0.09	0.09	10	1	10.0	276	5	1.8	0.01	0.01	2.00	1.26	13.5
VOLATILES ORGANIC COMPOUNDS																
X1CHLO	CHLOROFORM	ug/L	1	150.00	340.00	10	4	40.0	274	28	10.2	54.44	23.90	3.70	1.75	32.4
X1111T	1,1,1-TRICHLOROETHANE	ug/L	1	48.00	62.00	10	2	20.0	274	21	7.7	24.44	23.18	1.53	1.74	18.9
B2BDCL	BROMODICHLOROBENZENE	ug/L	1	40.00	40.00	10	1	10.0	274	2	0.7	21.44	20.55	1.25	1.12	5.4
X112CE	1,2-DICHLOROETHANE	ug/L	1	120.00	120.00	10	1	10.0	274	2	0.7	23.92	20.26	1.76	1.17	5.4

PLANT NAME : Niagara Falls (Stamford)
PLANT TYPE : Secondary

SAMPLING TYPE : Raw Sewage
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	PLANT MIN. CONC. > MDL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
VOLATILES ORGANIC COMPOUNDS																
X1DCLE	1,1-DICHLOROETHENE	ug/L	1	47.00	47.00	10	1	10.0	274	7	2.6	21.78	20.55	1.31	1.28	15.5

PLANT NAME : Niagara Falls (Stamford)
PLANT TYPE : Secondary

SAMPLING TYPE : Final Effluent
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	STD. FOR SURFACE WATER	STD. REF.	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET.	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																		
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0		-	11.60	44.30	10	10	100.0	213	211	99.1	18.04	21.22	1.45	2.07	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0		-	28.00	88.00	10	10	100.0	213	211	99.1	51.97	52.80	1.45	1.83	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0		-	8.80	11.00	10	10	100.0	220	220	100.0	9.67	8.09	1.08	1.60	100.0
NNHTFR	AMMONIUM,TOTAL FIL.T.REAC.	mg/L	0		-	12.70	18.60	10	10	100.0	223	204	91.5	15.48	3.90	1.15	6.98	100.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0		-	15.10	22.80	10	10	100.0	222	222	100.0	18.17	7.97	1.15	2.71	100.0
PH	(-LOG(H+(CONCN))		0		-	6.69	7.66	10	10	100.0	224	224	100.0	7.10	7.10	1.04	1.05	100.0
PPUT	PHOSPHORUS,UNFIL.T.TOTAL.	mg/L	0		-	0.53	1.08	6	6	100.0	211	206	97.6	0.86	0.68	1.32	1.97	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0		-	10.50	20.70	10	10	100.0	220	219	99.6	13.65	10.12	1.23	2.00	100.0
RSFLOI	RESIDUE,FIL.LOSS ON IGNI.	mg/L	0		-	10.90	12.10	2	2	100.0	77	58	75.3	11.48	7.47	1.08	2.71	95.3
NNO2FR	NITRITE,FIL.T. REACT.	mg/L	0		-	0.03	0.18	10	5	50.0	220	194	88.2	0.02	0.22	5.21	5.95	96.4
PHNOL	PHENOLICS (4AAP)	mg/L	0	0.00	ONT-MOE	0.10	0.16	10	2	20.0	225	33	14.7	0.06	0.07	1.50	1.86	53.6
NNOTFR	NITRATES,TOTAL FIL.T.REAC.	mg/L	0		-	0.25	0.25	10	1	10.0	224	186	83.0	0.04	2.33	2.16	7.75	98.4
METALS																		
HGUT	MERCURY,UNFIL.T.TOTAL.	ug/L	0	0.50	ONT-MOE	0.02	0.05	10	10	100.0	233	220	94.4	0.03	0.03	1.45	2.62	100.0
SRUT	STRONTIUM,UNFIL.T.TOTAL.	ug/L	0	3750.00	ONT-MOE	190.00	310.00	12	12	100.0	267	267	100.0	230.00	340.90	1.17	2.14	100.0
ZNUT	ZINC,UNFIL.T.TOTAL.	ug/L	0	30.00	ONT-MOE	20.00	30.00	12	12	100.0	267	262	98.1	30.00	53.30	1.13	2.48	100.0
ALUT	ALUMINUM,UNFIL.T.TOTAL.	ug/L	0	75.00	ONT-MOE	70.00	210.00	12	8	66.7	264	196	74.2	60.00	101.70	2.28	3.72	98.4
CUUT	COPPER,UNFIL.T.TOTAL.	ug/L	0	5.00	ONT-MOE	10.00	10.00	2	1	50.0	47	30	63.8	10.00	13.10	1.63	2.56	77.8
CDUT	CADMIUM,UNFIL.T.TOTAL.	ug/L	0	0.20	ONT-MOE	0.00	10.00	12	2	16.7	267	65	24.3	0.00	2.10	1.53	2.07	71.4
COUT	COBALT,UNFIL.T.TOTAL.	ug/L	0	5.00	NYS-STD	10.00	10.00	12	2	16.7	266	65	24.4	10.00	6.40	1.31	1.54	82.1
CRUT	CHROMIUM,UNFIL.T.TOTAL.	ug/L	0	100.00	ONT-MOE	10.00	10.00	12	2	16.7	267	137	51.3	10.00	9.00	1.31	2.00	89.3
CCNFUR	CYANIDE-FREE,UNFIL.T.REAC.	ug/L	0	5.00	ONT-MOE	10.00	10.00	10	1	10.0	222	42	18.9	0.00	1.30	2.33	3.68	46.4
NIUT	NICKEL,UNFIL.T.TOTAL.	ug/L	0	25.00	ONT-MOE	20.00	20.00	12	1	8.3	267	171	64.0	10.00	22.10	1.49	3.60	85.7
PBUT	LEAD,UNFIL.T.TOTAL.	ug/L	0	25.00	ONT-MOE	30.00	30.00	12	1	8.3	267	25	9.4	20.00	16.50	1.22	1.48	60.7
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																		
PNPHEN	PHENOL	ug/L	2	1.00	ONT-MOE	7.50	7.50	10	1	10.0	227	4	1.8	1.76	1.65	1.66	1.59	10.7
PESTICIDES,HERBICIDES,PCBS																		
P1BHC0	GAMMA-BHC(HEXCHLORCYCLHEXANE)	ug/L	2	0.06	ONT-MOE	0.01	0.10	10	9	90.0	227	157	69.2	0.03	0.02	2.53	2.48	98.4
P524D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	4.00	ONT-MOE	0.02	0.14	10	6	60.0	227	177	78.0	0.03	0.08	3.30	4.71	100.0
P1DMDT	METHOXYCHLOR	ug/L	1	0.04	ONT-MOE	1.00	1.00	10	1	10.0	227	31	13.7	0.04	0.04	3.21	2.72	35.7
P1PPDT	PP-DDT	ug/L	3	0.00	ONT-MOE	0.06	0.06	10	1	10.0	227	2	0.9	0.02	0.02	1.42	1.14	7.1
X2HCE	HEXACHLOROETHANE	ug/L	3		-	0.01	0.01	10	1	10.0	227	5	2.2	0.01	0.01	1.25	1.23	14.3
VOLATILES ORGANIC COMPOUNDS																		
X1CHLO	CHLOROFORM	ug/L	1	0.20	NYS-STD	6.10	110.00	10	2	20.0	234	37	16.5	1.93	1.37	4.63	2.18	64.3

PLANT NAME : Niagara Falls (Stamford)
PLANT TYPE : Secondary

SAMPLING TYPE : Raw Sludge
SAMPLE FORM : Dry Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS (DRY WEIGHT)	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
COD	CHEMICAL OXYGEN DEMAND	mg/kg	0	1354166.67	1693726.94	2	2	100.0	45	45	100.0	1514459.82	892221.45	1.17	3.19	100.0
NNHTPR	AMMONIUM,TOTAL PR.T.REAC.	mg/kg	0	11992.62	16636.90	2	2	100.0	48	47	97.9	14125.16	5911.32	1.26	4.59	100.0
NNTKUR	NITROGEN-TOT-KJEL.,UNP.TOT	mg/kg	0	38690.48	45387.45	2	2	100.0	51	51	100.0	41905.60	36897.85	1.12	2.98	100.0
PH	(-LOG(H+(CONCN))	mg/kg	0	5.34	6.72	2	2	100.0	49	49	100.0	5.99	6.03	1.18	1.10	100.0
PHNOL	PHENOLICS (4AAP)	mg/kg	0	129.15	357.14	2	2	100.0	50	41	82.0	214.77	82.34	2.05	5.54	85.3
PPUT	PHOSPHORUS,UNPR.T TOTAL	mg/kg	0	17113.10	17113.10	1	1	100.0	42	42	100.0	17113.10	20347.70	0.00	4.43	100.0
RST	RESIDUE, TOTAL	mg/kg	0	27100.00	33600.00	2	2	100.0	51	51	100.0	30175.49	32783.51	1.16	1.81	100.0
RSTLOI	RESIDUE,TOT.LOSS ON IGNI.	mg/kg	0	17600.00	21600.00	2	2	100.0	51	51	100.0	19497.69	20803.05	1.16	1.77	100.0
NNOTPR	NITRATES,TOTAL PR.T REAC.	mg/kg	0	43.15	43.15	2	1	50.0	48	43	89.6	44.62	25.44	1.05	2.21	93.9
METALS																
ALUT	ALUMINUM,UNPR.T TOTAL.	mg/kg	0	4763.10	5160.05	2	2	100.0	51	51	100.0	4960.48	9835.74	1.08	2.51	100.0
ASUT	ARSENIC,UNPR.T.TOTAL.	mg/kg	0	3.87	8.49	2	2	100.0	51	50	98.0	5.73	6.13	1.74	2.01	97.1
CDUT	CADMIUM,UNPR.T.TOTAL.	mg/kg	0	1.44	2.68	2	2	100.0	43	40	93.0	1.96	9.74	1.55	4.35	90.0
COUT	COBALT,UNPR.T.TOTAL.	mg/kg	0	8.49	16.96	2	2	100.0	41	30	73.2	12.00	9.29	1.63	4.69	73.3
CRUT	CHROMIUM,UNPR.T.TOTAL.	mg/kg	0	44.28	102.08	2	2	100.0	51	50	98.0	67.23	301.43	1.81	3.68	97.1
CUUT	COPPER,UNPR.T.TOTAL.	mg/kg	0	243.54	305.36	2	2	100.0	46	46	100.0	272.70	606.31	1.17	1.72	100.0
HGUT	MERCURY,UNPR.T TOTAL.	mg/kg	0	1.49	2.58	2	2	100.0	46	44	95.7	1.96	2.23	1.48	1.67	100.0
NIUT	NICKEL,UNPR.T.TOTAL.	mg/kg	0	18.15	22.14	2	2	100.0	49	48	98.0	20.05	59.17	1.15	2.90	93.3
PBUT	LEAD,UNPR.T.TOTAL.	mg/kg	0	91.05	173.99	2	2	100.0	49	48	98.0	91.05	173.99	1.69	2.24	96.9
SBUT	SELENIUM,UNPR.T.TOTAL.	mg/kg	0	62.73	132.14	2	2	100.0	50	48	96.0	3.14	3.04	2.23	1.93	93.9
SEUT	STRONTIUM,UNPR.T.TOTAL.	mg/kg	0	1.79	5.54	2	2	100.0	51	51	100.0	142.15	231.70	1.30	1.97	100.0
SRUT	ZINC,UNPR.T TOTAL.	mg/kg	0	118.08	171.13	2	2	100.0	51	51	100.0	350.75	905.39	1.37	2.39	100.0
ZNUT		mg/kg	0	280.44	438.69	2	2	100.0	51	51	100.0					
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PMMCRE	M-CRESOL	ug/kg	1	389881.00	1431734.30	2	2	100.0	51	42	82.3	747131.80	116847.30	2.51	12.16	85.3
PMPHEN	PHENOL	ug/kg	2	38690.50	62730.60	2	2	100.0	51	15	29.4	49265.40	7312.80	1.41	3.00	38.2
PNCHRY	CHRYSENE	ug/kg	1	21549.80	21549.80	2	1	50.0	51	2	3.9	8008.50	3026.90	4.05	1.93	5.9
PNPHEN	PHENANTHRENE	ug/kg	1	22494.00	22494.00	2	1	50.0	51	6	11.8	9110.60	3563.50	3.59	2.19	17.7
PESTICIDES,HERBICIDES,PCBS																
P24D	2,4-DICHLOROPHENOXYACETIC ACID	ug/kg	3	199.30	2976.20	2	2	100.0	51	38	74.5	770.20	93.20	6.76	6.50	82.3
PBHCA	ALPHA-BHC(HEXACHLORCYCLOHEXANE)	ug/kg	1	53.60	53.60	2	1	50.0	51	12	23.5	14.10	5.50	6.62	2.74	35.3
PBHCB	BETA-BHC (HEXACHLORCYCLOHEXANE)	ug/kg	1	35.70	35.70	2	1	50.0	51	18	35.3	11.50	7.40	4.97	3.29	38.2
PBHCG	GAMMA-BHC(HEXACHLORCYCLOHEXANE)	ug/kg	2	11.10	11.10	2	1	50.0	51	28	54.9	5.80	8.90	2.52	2.69	67.7
PDIEL	DIELDRIN	ug/kg	2	11.10	11.10	2	1	50.0	51	20	39.2	5.80	7.20	2.52	3.10	50.0
PPDD	PP-DDD	ug/kg	1	7.40	7.40	2	1	50.0	51	13	25.5	4.70	5.10	1.89	2.48	35.3
PPDDT	PP-DDT	ug/kg	3	62.70	62.70	2	1	50.0	51	6	11.8	27.30	16.40	3.24	2.27	17.7
P245T	2,4,5-TRICHLORPHENOXYACETIC ACID	ug/kg	3	744.00	744.00	2	1	50.0	51	21	41.2	117.30	48.90	13.63	3.49	47.1
PSILV	SILVEX	ug/kg	3	774.90	774.90	2	1	50.0	51	23	45.1	339.60	47.30	3.21	3.40	55.9

PLANT NAME : Niagara Falls (Stamford)
PLANT TYPE : Secondary

SAMPLING TYPE : Treated Sludge
SAMPLE FORM : Dry Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS (DRY WEIGHT)	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
COD	CHEMICAL OXYGEN DEMAND	mg/kg	0	784789.64	948905.11	2	2	100.0	36	36	100.0	862954.75	508097.94	1.14	4.65	100.0
NNHTPR	AMMONIUM,TOTAL FIL.T.REAC.	mg/kg	0	14174.76	19951.34	2	2	100.0	25	25	100.0	16816.82	17658.28	1.27	2.92	100.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/kg	0	41262.14	47445.26	2	2	100.0	49	49	100.0	44245.82	38494.12	1.10	1.77	100.0
PH	(-LOG(H+(CONCN))	mg/kg	0	7.25	7.47	2	2	100.0	47	47	100.0	7.36	7.17	1.02	1.09	100.0
PPUT	PHOSPHORUS,UNFIL.T.TOTAL	mg/kg	0	38929.44	38929.44	1	1	100.0	43	43	100.0	38929.44	76638.67	0.00	6.91	100.0
RST	RESIDUE, TOTAL	mg/kg	0	41100.00	61800.00	2	2	100.0	50	50	100.0	50398.21	80434.04	1.33	3.23	100.0
RSTLOI	RESIDUE,TOT LOSS ON IGNI.	mg/kg	0	17900.00	26500.00	2	2	100.0	50	50	100.0	21779.58	43379.33	1.32	3.19	100.0
NNOTPR	NITRATES,TOTAL FIL.T.REAC.	mg/kg	0	41.36	41.36	2	1	50.0	26	23	88.5	28.92	42.68	1.66	2.29	95.0
PHNOL	PHENOLICS (4AAP)	mg/kg	0	93.85	93.85	2	1	50.0	49	41	83.7	33.79	43.05	4.24	3.14	87.9
METALS																
AGUT	SILVER,UNFIL.T.TOTAL	mg/kg	0	38.84	44.04	2	2	100.0	44	44	100.0	41.36	37.78	1.09	2.33	100.0
ALUT	ALUMINUM,UNFIL.T.TOTAL	mg/kg	0	7901.22	12621.36	2	2	100.0	50	50	100.0	9986.20	10715.94	1.39	2.82	100.0
ASUT	ARSENIC,UNFIL.T.TOTAL	mg/kg	0	5.18	8.03	2	2	100.0	50	49	98.0	6.45	5.40	1.36	2.06	97.1
CDUT	CADMIUM,UNFIL.T.TOTAL	mg/kg	0	2.91	3.89	2	2	100.0	45	41	91.1	3.37	10.47	1.23	3.98	90.3
COUT	COBALT,UNFIL.T.TOTAL	mg/kg	0	7.61	19.22	2	2	100.0	39	32	82.1	12.09	9.14	1.93	2.75	85.7
CRUT	CHROMIUM,UNFIL.T.TOTAL	mg/kg	0	105.18	162.77	2	2	100.0	50	50	100.0	130.84	333.06	1.36	3.59	100.0
CUUT	COPPER,UNFIL.T.TOTAL	mg/kg	0	501.62	506.81	2	2	100.0	45	45	100.0	504.21	732.24	1.01	2.16	100.0
HGUT	MERCURY,UNFIL.T.TOTAL	mg/kg	0	3.24	24.09	2	2	100.0	50	49	98.0	8.83	3.24	4.13	2.04	97.1
MOUT	MOLYBDENUM,UNFIL.T.TOTAL	mg/kg	0	3.24	3.24	1	1	100.0	34	23	67.7	3.24	6.41	0.00	2.84	69.2
NIUT	NICKEL,UNFIL.T.TOTAL	mg/kg	0	27.49	29.13	2	2	100.0	45	42	93.3	28.30	72.95	1.06	2.95	90.0
PBUT	LEAD,UNFIL.T.TOTAL	mg/kg	0	161.81	183.21	2	2	100.0	50	49	98.0	172.18	196.62	1.09	2.46	97.1
SEUT	SELENIUM,UNFIL.T.TOTAL	mg/kg	0	3.16	3.72	2	2	100.0	50	48	96.0	3.43	2.67	1.12	2.99	97.1
SRUT	STRONTIUM,UNFIL.T.TOTAL	mg/kg	0	177.99	235.04	2	2	100.0	50	50	100.0	204.54	260.93	1.22	2.34	100.0
ZNUT	ZINC,UNFIL.T.TOTAL	mg/kg	0	663.26	663.43	2	2	100.0	50	50	100.0	663.35	988.90	1.00	2.57	100.0
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PNPHEN	PHENANTHRENE	ug/kg	1	16181.20	20019.50	2	2	100.0	50	12	24.0	17998.30	2220.50	1.16	4.27	26.5
PNBAA	BENZO(A)ANTHRACENE	ug/kg	1	6666.70	6666.70	2	1	50.0	50	2	4.0	4027.50	1379.50	2.04	3.41	5.9
PNCHRY	CHRYSENE	ug/kg	1	9029.10	9029.10	2	1	50.0	50	4	8.0	4687.10	1475.50	2.53	3.39	11.
PESTICIDES,HERBICIDES,PCBS																
P1BHCB	BETA-BHC (HEXACHLORCYCLOHEXANE)	ug/kg	1	3.20	12.20	2	2	100.0	50	19	38.0	6.20	8.80	2.58	4.39	47.1
P1PPDE	PP-DDE	ug/kg	1	7.30	12.90	2	2	100.0	50	34	68.0	9.70	11.10	1.50	2.72	73.5
P24D	2,4-DICHLOROPHENOXYACETIC ACID	ug/kg	3	356.00	1046.20	2	2	100.0	50	25	50.0	610.30	75.00	2.14	5.81	64.7
P35DNV	3,5-DINITROVERATROLE	ug/kg	3	316.30	582.50	2	2	100.0	50	18	36.0	429.20	92.70	1.54	2.94	44.1
P1BHCA	ALPHA-BHC(HEXACHLORCYCLOHEXANE)	ug/kg	1	36.50	36.50	2	1	50.0	50	11	22.0	7.60	5.60	9.13	3.00	32.4
P1CHLA	ALPHA-CHLORDANE	ug/kg	1	6.50	6.50	2	1	50.0	50	22	44.0	3.90	6.50	2.02	2.41	55.9
P1CHLG	GAMMA-CHLORDANE	ug/kg	1	4.90	4.90	2	1	50.0	50	21	42.0	3.40	6.80	1.66	2.58	52.9
P1DIEL	DIELDRIN	ug/kg	2	17.80	17.80	2	1	50.0	50	15	30.0	6.50	6.50	4.12	3.51	38.2
P1HEPE	HEPTACHLOREPOXIDE	ug/kg	2	4.90	4.90	2	1	50.0	50	10	20.0	3.40	5.20	1.66	2.86	23.5
P1PPDD	PP-DDD	ug/kg	1	11.30	11.30	2	1	50.0	50	7	14.0	5.20	4.60	2.99	2.47	20.6
P1PPDT	PP-DDT	ug/kg	3	24.30	24.30	2	1	50.0	50	5	10.0	15.40	16.70	1.91	2.14	14.7
P245T	2,4,5-TRICHLOROPHENOXYACETIC ACID	ug/kg	3	292.00	292.00	2	1	50.0	50	16	32.0	48.60	84.40	12.62	3.13	41.2
X2HCB	HEXACHLOROBENZENE	ug/kg	2	3.20	3.20	2	1	50.0	50	21	42.0	2.80	7.00	1.23	2.96	55.9

PLANT NAME : Niagara Falls (Stamford)
PLANT TYPE : Secondary

SAMPLING TYPE : Treated Sludge
SAMPLE FORM : Dry Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
COD	CHEMICAL OXYGEN DEMAND	mg/kg	0	784789.64	948905.11	2	2	100.0	56	56	100.0	862954.75	508087.94	1.14	4.65	100.0
NNHTPR	AMMONIUM,TOTAL FILT.REAC.	mg/kg	0	14174.76	19951.34	2	2	100.0	25	25	100.0	16816.82	17658.28	1.27	2.92	100.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/kg	0	41262.14	47445.26	2	2	100.0	49	49	100.0	44265.82	38494.12	1.10	1.77	100.0
PH	(-LOG(H+(CONCN))	mg/kg	0	7.25	7.47	2	2	100.0	47	47	100.0	7.36	7.17	1.02	1.09	100.0
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/kg	0	38929.44	38929.44	1	1	100.0	43	43	100.0	38929.44	76638.67	0.00	6.91	100.0
RST	RESIDUE, TOTAL	mg/kg	0	41100.00	61800.00	2	2	100.0	50	50	100.0	50398.21	80434.04	1.33	3.23	100.0
RSTLOI	RESIDUE,TOT.LOSS ON IGN'.	mg/kg	0	17900.00	26500.00	2	2	100.0	50	50	100.0	21779.58	45379.33	1.32	3.19	100.0
NNOTPR	NITRATES,TOTAL FILT.REAC.	mg/kg	0	41.36	41.36	2	1	50.0	26	23	88.5	28.92	42.68	1.66	2.29	95.0
PHNOL	PHENOLICS (4AAP)	mg/kg	0	93.85	93.85	2	1	50.0	49	41	83.7	33.79	43.05	4.24	3.14	87.9
METALS																
AGUT	SILVER,UNFILT.TOTAL	mg/kg	0	38.84	44.04	2	2	100.0	44	44	100.0	41.36	37.78	1.09	2.33	100.0
ALUT	ALUMINUM,UNFILT.TOTAL	mg/kg	0	7901.22	12621.36	2	2	100.0	50	50	100.0	9986.20	10715.94	1.39	2.82	100.0
ASUT	ARSENIC,UNFILT.TOTAL	mg/kg	0	5.18	8.05	2	2	100.0	50	49	98.0	6.45	5.40	1.36	2.06	97.1
CDUT	CADMIUM,UNFILT.TOTAL	mg/kg	0	2.91	3.89	2	2	100.0	45	41	91.1	3.37	10.47	1.23	3.98	90.3
COUT	COBALT,UNFILT.TOTAL	mg/kg	0	7.61	19.22	2	2	100.0	39	32	82.1	12.09	9.14	1.93	2.75	85.7
CRUT	CHROMIUM,UNFILT.TOTAL	mg/kg	0	105.18	162.77	2	2	100.0	50	50	100.0	130.84	333.06	1.36	3.59	100.0
CUUT	COPPER,UNFILT.TOTAL	mg/kg	0	501.62	506.81	2	2	100.0	45	45	100.0	504.21	732.24	1.01	2.16	100.0
HGUT	MERCURY,UNFILT.TOTAL	ug/kg	0	3.24	24.09	2	2	100.0	50	49	98.0	8.83	3.24	4.13	2.04	97.1
MOUT	MOLYBDENUM,UNFILT.TOTAL	mg/kg	0	3.24	3.24	1	1	100.0	34	23	67.7	3.24	6.41	0.00	2.84	69.2
NIUT	NICKEL,UNFILT.TOTAL	mg/kg	0	27.49	28.13	2	2	100.0	45	42	93.3	28.30	72.95	1.04	2.95	90.0
PBUT	LEAD,UNFILT.TOTAL	mg/kg	0	161.81	185.21	2	2	100.0	50	49	98.0	172.18	196.62	1.09	2.46	97.1
SEUT	SELENIUM,UNFILT.TOTAL	mg/kg	0	3.16	3.72	2	2	100.0	50	48	96.0	3.43	2.67	1.12	2.98	97.1
SRUT	STRONTIUM,UNFILT.TOTAL	mg/kg	0	177.99	233.04	2	2	100.0	50	50	100.0	204.54	240.93	1.22	2.54	100.0
ZNUT	ZINC,UNFILT.TOTAL	mg/kg	0	663.26	663.43	2	2	100.0	50	50	100.0	663.35	988.90	1.00	2.57	100.0
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PNPHEN	PHENANTHRENE	ug/kg	1	16.18	20.02	2	2	100.0	50	12	24.0	18000.00	2220.00	1.16	4.27	26.5
PNBAA	BENZO(A)ANTHRACENE	ug/kg	1	6.67	6.67	2	1	50.0	50	2	4.0	4030.00	1380.00	2.04	3.41	5.9
PNCHRY	CHRYSENE	ug/kg	1	9.03	9.03	2	1	50.0	50	4	8.0	4690.00	1480.00	2.53	3.39	11.8
PESTICIDES,HERBICIDES,PCBS																
P1BHCB	BETA-BHC (HEXCHLORCYCLHEXANE)	ug/kg	1	0.00	0.01	2	2	100.0	50	19	38.0	10.00	10.00	2.58	4.39	47.1
P1PPDE	PP-DDE	ug/kg	1	0.01	0.01	2	2	100.0	50	34	68.0	10.00	10.00	1.50	2.72	73.5
P324D	2,4-DICHLOROPHENOXYACETIC ACID	ug/kg	3	0.36	1.05	2	2	100.0	50	25	50.0	610.00	80.00	2.14	5.81	64.7
P56ILV	SILVEX	ug/kg	3	0.32	0.58	2	2	100.0	50	18	36.0	430.00	90.00	1.54	2.94	44.1
P1BHCA	ALPHA-BHC(HEXCHLORCYCLHEXANE)	ug/kg	1	0.04	0.04	2	1	50.0	50	11	22.0	10.00	10.00	9.13	3.00	32.4
P1CHLA	ALPHA-CHLORDANE	ug/kg	1	0.01	0.01	2	1	50.0	50	22	44.0	0.00	10.00	2.02	2.41	55.9
P1CHLG	GAMMA-CHLORDANE	ug/kg	1	0.00	0.00	2	1	50.0	50	21	42.0	0.00	10.00	1.66	2.58	52.9
P1DIEL	DIELDRIN	ug/kg	2	0.02	0.02	2	1	50.0	50	15	30.0	10.00	10.00	4.12	3.51	38.2
P1HEPE	HEPTACHLOREPOXIDE	ug/kg	2	0.00	0.00	2	1	50.0	50	10	20.0	0.00	10.00	1.66	2.86	23.5
P1PPDD	PP-DDD	ug/kg	1	0.01	0.01	2	1	50.0	50	7	14.0	10.00	0.00	2.99	2.47	20.6
P1PPDT	PP-DDT	ug/kg	3	0.02	0.02	2	1	50.0	50	5	10.0	20.00	20.00	1.91	2.14	14.7
P245T	2,4,5-TRICLORPHENOXYACETIC ACID	ug/kg	3	0.29	0.29	2	1	50.0	50	16	32.0	50.00	80.00	12.62	5.13	41.2
X2HCB	HEXACHLOROBENZENE	ug/kg	2	0.00	0.00	2	1	50.0	50	21	42.0	0.00	10.00	1.25	2.96	35.9

PLANT NAME : Niagara Falls (Stamford)
PLANT TYPE : Secondary

SAMPLING TYPE : Treated Sludge
SAMPLE FORM : Dry Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS (DRY WEIGHT)	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
VOLATILE ORGANIC COMPOUNDS																
X1CDBM	CHLORODIBROMOMETHANE	ug/kg	1	6634.30	6634.30	2	1	50.0	50	1	2.0	1796.70	264.10	6.34	3.53	2.9

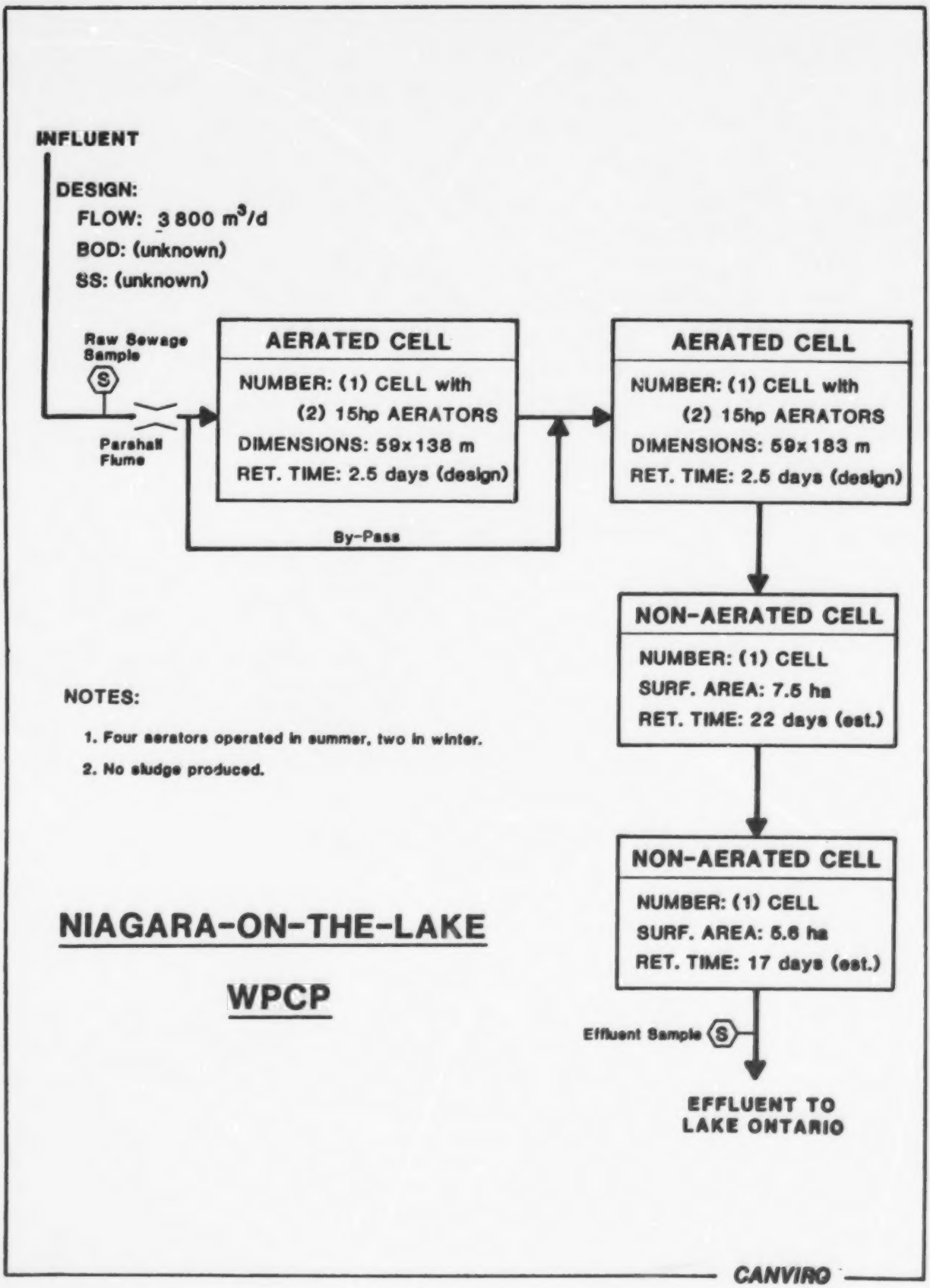
Sub-Appendix A-18

Niagara-on-the-Lake Lagoon

Contents:

- Plant Schematic with Design Characteristics
- Sources of Municipal Water Pollution Control Plant Raw Sewage
- Operational Evaluation for Niagara-on-the-Lake Lagoon
- Analytical Data

(KIR18/28A)


INFLUENT
DESIGN:
FLOW: 3 800 m³/d
BOD: (unknown)
SS: (unknown)
Raw Sewage Sample
S
Parshall Flume
AERATED CELL
NUMBER: (1) CELL with (2) 15hp AERATORS
DIMENSIONS: 59x138 m
RET. TIME: 2.5 days (design)
By-Pass
AERATED CELL
NUMBER: (1) CELL with (2) 15hp AERATORS
DIMENSIONS: 59x183 m
RET. TIME: 2.5 days (design)
NON-AERATED CELL
NUMBER: (1) CELL
SURF. AREA: 7.5 ha
RET. TIME: 22 days (est.)
NON-AERATED CELL
NUMBER: (1) CELL
SURF. AREA: 5.6 ha
RET. TIME: 17 days (est.)
Effluent Sample
S
EFFLUENT TO LAKE ONTARIO
NOTES:
1. Four aerators operated in summer, two in winter.
2. No sludge produced.
NIAGARA-ON-THE-LAKE
WPCP
CANVIRO

R

SOURCES OF MUNICIPAL WATER POLLUTION CONTROL PLANT RAW SEWAGE

GENERAL DESCRIPTION OF WATER POLLUTION CONTROL PLANT (WPCP)

NAME OF WPCP	NIAGARA ON THE LAKE LAGOON
WORKS NUMBER	120001238
TREATMENT TYPE	AERATED CELL PLUS LAGOON
DESIGN CAPACITY (1000 m3/d)	3.841
1986 AVERAGE DAY FLOW (1000 m3/d)	4.152
POPULATION SERVED	5210

% OF TOTAL FLOW ATTRIBUTED TO:

INDUSTRIAL SOURCES (%)	25
COMMERCIAL SOURCES (%) (Population x 0.0757)	9
RESIDENTIAL SOURCES (%) (Population x 0.175)	22
UNACCOUNTED FOR, INCL. INFILTRATION (100-% Contributed from industrial, commercial and residential sources)	44

PROFILE OF INDUSTRIES IN CATCHMENT

TOTAL NO OF INDUSTRIES	27
INDUSTRIES WITH WATER	18
NO OF SIC CATEGORIES	13

DESCRIPTION OF THE TOP 5 INDUSTRIES DISCHARGED TO THE WPCP (BASED ON WATER USE DATA)

DESCRIPTION	SIC	# OF COMPANIES
FRUIT AND VEGETABLES	2032-2038	2
DAIRY	2021-2026	1
TRANSPORTATION EQUIPMENT	3711-3799	2
BEVERAGES	2082-2087	4
METAL FINISHING	3411-3491	3

R

OPERATIONAL EVALUATION FOR: NIAGARA-ON-THE-LAKE LAGOON

TREATMENT FACILITY: Other (Lagoon)
PERIOD ENDING: May 29, 1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 3840 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
RAW SEWAGE FLOW	3,196	3,364	3,341	3,541	3,564	3,278	3,269
% of Design Flow	83.23%	87.60%	87.01%	92.21%	92.81%	85.36%	85.13%
Influent BOD (mg/L)			112.0				
Primary BOD (mg/L)							
Secondary BOD (mg/L)			34.0				
% PRIMARY REMOVAL							
% SECONDARY REMOVAL			69.6				
Influent SS (mg/L)			47.0				
Primary SS (mg/L)							
Secondary SS (mg/L)			12.0				
% PRIMARY REMOVAL							
% SECONDARY REMOVAL			74.5				
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)			9.84				
Primary Total P (mg/L)							
Secondary Total P (mg/L)			3.06				
% PRIMARY REMOVAL							
% SECONDARY REMOVAL			68.90				

OPERATIONAL EVALUATION FOR: NIAGARA-ON-THE-LAKE LAGOON

TREATMENT FACILITY: Other (Lagoon)
PERIOD ENDING: May 29, 1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 3840 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 8	DAY 9	DAY 10	DAY 11	DAY 12	DAY 13	DAY 14
RAW SEWAGE FLOW	3,200	3,200	2,655	2,987	2,987	3,614	3,587
% of Design Flow	83.33%	83.33%	69.14%	77.79%	77.79%	94.11%	93.41%
Influent BOD (mg/L)		176.0					
Primary BOD (mg/L)							
Secondary BOD (mg/L)		22.0					
% PRIMARY REMOVAL							
% SECONDARY REMOVAL		87.5					
Influent SS (mg/L)		242.0			148.0		
Primary SS (mg/L)							
Secondary SS (mg/L)		32.0			51.0		
% PRIMARY REMOVAL							
% SECONDARY REMOVAL		86.8			65.5		
Influent NH4 (mg/L)		20.0					
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)		5.5					
% PRIMARY REMOVAL							
% SECONDARY REMOVAL		72.8					
Influent TKN (mg/L)		29.0					
Primary TKN (mg/L)							
Secondary TKN (mg/L)		9.1					
% PRIMARY REMOVAL							
% SECONDARY REMOVAL		68.6					
Influent Total P (mg/L)		5.50					
Primary Total P (mg/L)							
Secondary Total P (mg/L)		2.40					
% PRIMARY REMOVAL							
% SECONDARY REMOVAL		56.36					

OPERATIONAL EVALUATION FOR: NIAGARA-ON-THE-LAKE LAGOON

TREATMENT FACILITY: Other (Lagoon)
PERIOD ENDING: May 29, 1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 3840 m3/d

PARAMETER	SAMPLING PERIOD						
	DAY 15	DAY 16	DAY 17	DAY 18	DAY 19	DAY 20	DAY 21
RAW SEWAGE FLOW	3,505	2,996	2,996	4,191	1,755		
% of Design Flow	91.28%	78.02%	78.02%	109.14%	45.70%		
Influent BOD (mg/L)							
Primary BOD (mg/L)							
Secondary BOD (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent SS (mg/L)	156.0						
Primary SS (mg/L)							
Secondary SS (mg/L)	46.0						
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	70.5						
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)							
Primary Total P (mg/L)							
Secondary Total P (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							

PLANT NAME : Niagara-on-the-Lake
PLANT TYPE : Lagoon

SAMPLING TYPE : Raw Sewage
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	PLANT MIN. CONC. > \ DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0	80.70	135.00	5	5	100.0	267	266	99.6	109.64	140.23	1.26	1.93	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0	200.00	252.00	5	5	100.0	260	258	99.2	224.07	287.75	1.09	1.82	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0	16.00	20.00	5	5	100.0	271	271	100.0	17.85	22.39	1.09	1.81	100.0
NNHTFR	AMMONIUM,TOTAL FIL.T.REAC.	mg/L	0	15.80	20.10	5	5	100.0	275	274	99.6	18.61	15.37	1.10	1.69	100.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0	21.50	51.00	5	5	100.0	273	273	100.0	33.18	25.44	1.38	1.47	100.0
PH	(-LOG(H+(CONCN))		0	7.08	7.13	5	5	100.0	275	275	100.0	7.11	6.90	1.00	1.05	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0	77.00	122.00	5	5	100.0	267	266	99.6	97.00	126.88	1.23	1.93	100.0
RSPLOI	RESIDUE,PAR.LOSS ON IGNI.	mg/L	0	64.70	96.00	2	2	100.0	90	89	98.9	78.81	100.84	1.32	1.78	100.0
NNO2FR	NITRITE,FIL.T. REACT.	mg/L	0	0.03	0.06	5	2	40.0	271	58	21.4	0.01	0.01	3.55	2.98	51.4
METALS																
ALUT	ALUMINUM,UNFIL.T.TOTAL	ug/L	0	570.00	1300.00	6	6	100.0	322	306	95.0	840.00	1000.10	1.37	2.65	97.3
CUUT	COPPER,UNFIL.T.TOTAL	ug/L	0	530.00	530.00	1	1	100.0	49	48	98.0	530.00	110.60	0.00	2.28	97.1
HGUT	MERCURY,UNFIL.T.TOTAL	ug/L	0	0.07	0.19	5	5	100.0	283	274	96.8	0.13	0.23	1.53	2.11	100.0
SRUT	STRONTIUM,UNFIL.T.TOTAL	ug/L	0	220.00	240.00	6	6	100.0	319	318	99.7	230.00	370.70	1.03	2.14	100.0
ZNUT	ZINC,UNFIL.T.TOTAL	ug/L	0	50.00	100.00	6	6	100.0	322	315	97.8	70.00	211.00	1.27	2.94	100.0
AGUT	SILVER,UNFIL.T.TOTAL	ug/L	0	10.00	20.00	6	3	50.0	321	82	25.6	10.00	10.40	1.76	2.55	75.7
COUT	COBALT,UNFIL.T.TOTAL	ug/L	0	50.00	50.00	6	2	33.3	322	82	25.5	10.00	9.30	3.28	2.31	83.8
CDUT	CADMIUM,UNFIL.T.TOTAL	ug/L	0	30.00	30.00	6	1	16.7	322	76	23.6	10.00	6.50	1.96	2.09	70.3
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PMMCRE	M-CRESOL	ug/L	1	22.00	117.40	5	5	100.0	275	167	60.7	54.65	25.59	1.94	3.45	86.5
PMPHEN	PHENOL	ug/L	2	36.80	49.70	5	3	60.0	275	118	42.9	20.77	14.52	2.55	2.46	78.4
PESTICIDES,HERBICIDES,PCBS																
P24D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	0.11	0.11	5	2	40.0	276	214	77.5	0.04	0.13	2.54	3.72	100.0
P1BHCG	GAMMA-BHC(HEXCHLORCYCLOHEXANE)	ug/L	2	0.05	0.05	5	1	20.0	276	143	51.8	0.01	0.02	2.05	2.29	94.6
P1END1	ENDOSULFAN I	ug/L	3	0.03	0.03	5	1	20.0	276	4	1.5	0.01	0.01	1.63	1.30	5.4
P1END5	ENDOSULFAN SULPHATE	ug/L	3	0.18	0.18	5	1	20.0	276	13	4.7	0.05	0.04	1.96	1.56	16.2
P1PPDE	PP-DDE	ug/L	1	0.04	0.04	5	1	20.0	276	15	5.4	0.01	0.01	1.86	1.74	24.3
P1PPDT	PP-DDT	ug/L	3	0.12	0.12	5	1	20.0	276	9	3.3	0.05	0.04	1.63	1.35	18.9

PLANT NAME: Niagara-on-the-Lake
PLANT TYPE : Lagoon

SAMPLING TYPE : Final Effluent
SAMPLE FORM : Wet Weight

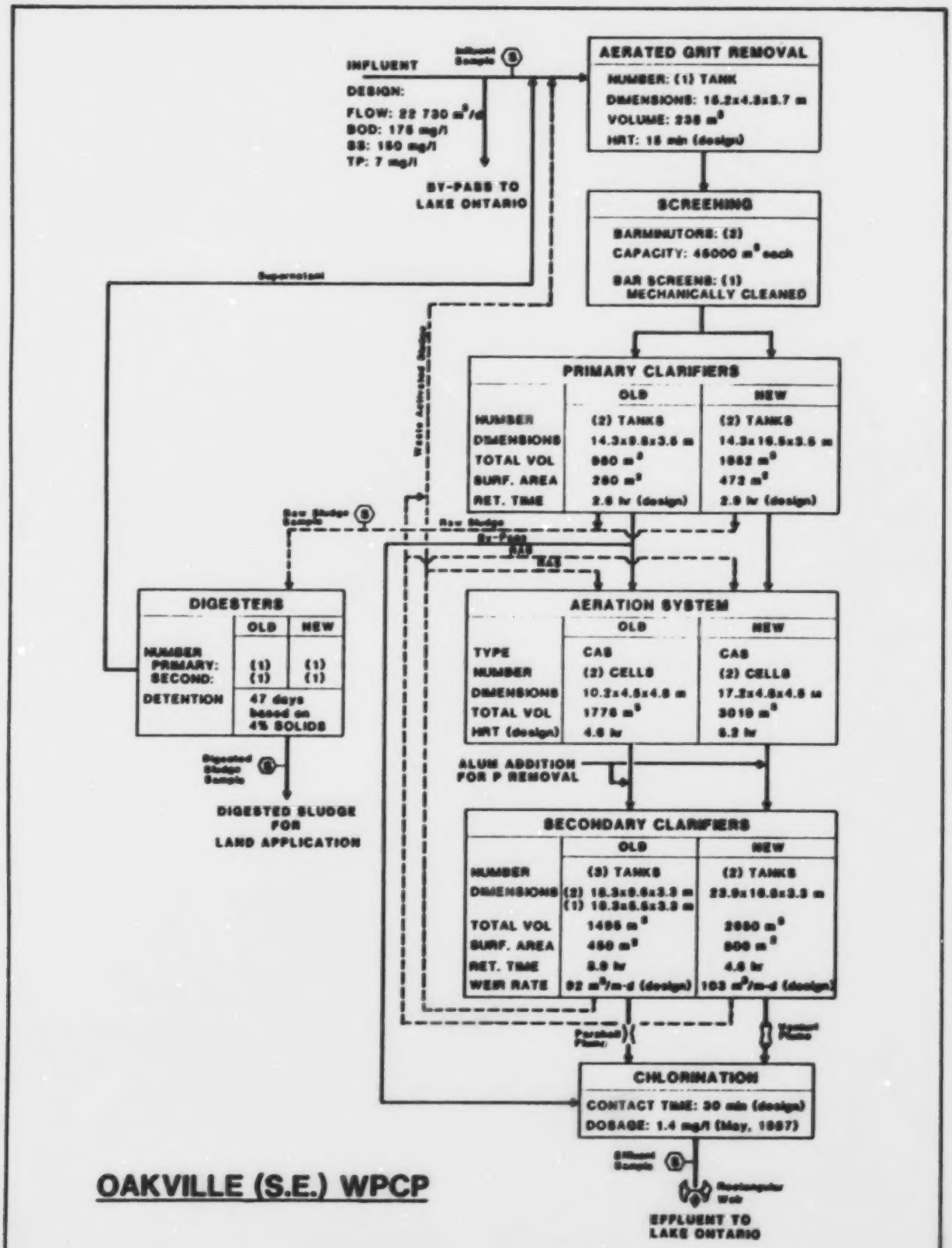
CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	STD. FOR SURFACE WATER	STD. REF.	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET.	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																		
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0		-	27.00	48.20	5	5	100.0	10	10	100.0	40.60	25.95	1.26	1.66	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0		-	88.00	110.00	5	5	100.0	10	10	100.0	100.32	70.64	1.12	1.47	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0		-	11.00	11.60	5	5	100.0	10	10	100.0	11.28	10.09	1.02	1.14	100.0
NNO2FR	NITRITE,FILT. REACT.	mg/L	0		-	0.13	3.62	5	5	100.0	10	10	100.0	1.39	0.42	3.98	4.77	100.0
NNOTPR	NITRATES,TOTAL FILT.REAC.	mg/L	0		-	4.10	6.15	5	5	100.0	10	10	100.0	4.97	1.65	1.17	3.25	100.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0		-	8.70	43.00	5	5	100.0	10	10	100.0	12.86	10.85	1.98	1.64	100.0
PH	(-LOG(H+(CONCN))		0		-	7.57	8.13	5	5	100.0	10	10	100.0	7.85	7.92	1.03	1.03	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0		-	30.40	51.40	5	5	100.0	10	10	100.0	41.12	29.12	1.24	1.50	100.0
RSPLOI	RESIDUE,PART.LOSS ON IGNI.	mg/L	0		-	39.80	42.20	2	2	100.0	2	2	100.0	40.98	40.98	1.06	1.04	100.0
PHNOL	PHENOLICS (4AAP)	mg/L	0	0.00	ONT-MOE	0.13	0.34	5	2	40.0	10	2	20.0	0.09	0.07	2.36	1.91	50.0
NNHTPR	AMMONIUM,TOTAL FILT.REAC.	mg/L	0		-	0.65	0.65	5	1	20.0	10	6	60.0	0.06	0.60	4.19	12.80	100.0
METALS																		
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	75.00	ONT-MOE	100.00	160.00	6	6	100.0	12	12	100.0	140.00	171.20	1.19	1.31	100.0
CUUT	COPPER,UNFILT.TOTAL	ug/L	0	5.00	ONT-MOE	10.00	10.00	1	1	100.0	2	1	50.0	10.00	10.00	0.00	0.00	50.0
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	0.20	ONT-MOE	0.01	0.01	5	5	100.0	10	10	100.0	0.01	0.01	1.00	1.25	100.0
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	3750.00	ONT-MOE	290.00	330.00	6	6	100.0	12	12	100.0	310.00	230.70	1.05	1.36	100.0
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	30.00	ONT-MOE	10.00	20.00	6	6	100.0	12	11	91.7	10.00	11.90	1.33	1.37	100.0
COUT	COBALT,UNFILT.TOTAL	ug/L	0	5.00	NYS-STD	10.00	10.00	6	2	33.3	12	3	25.0	10.00	6.30	1.43	1.41	100.0
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	100.00	ONT-MOE	10.00	10.00	6	2	33.3	12	2	16.7	10.00	5.90	1.43	1.37	50.0
MOUT	MOLYBDENUM,UNFILT.TOTAL	ug/L	0		-	10.00	10.00	6	2	33.3	12	3	25.0	10.00	5.90	1.43	1.37	100.0
CDUT	CADMIUM,UNFILT.TOTAL	ug/L	0	0.20	ONT-MOE	0.00	0.00	6	1	16.7	12	3	25.0	0.00	1.80	1.33	1.49	100.0
NIUT	NICKEL,UNFILT.TOTAL	ug/L	0	25.00	ONT-MOE	30.00	30.00	6	1	16.7	12	3	25.0	10.00	6.90	2.08	1.74	100.0
PESTICIDES,HERBICIDES,PCBS																		
P524D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	4.00	ONT-MOE	0.03	0.10	5	2	40.0	10	7	70.0	0.02	0.03	2.78	2.08	100.0
P1END1	ENDOSULFAN SULPHATE	ug/L	3		-	0.15	0.15	5	1	20.0	10	1	10.0	0.03	0.02	2.46	1.89	50.0

Sub-Appendix A-19

Oakville (Southeast) WPCP

Contents:

- Plant Schematic with Design Characteristics
- Annual Data Review (1981 - 1986 Plant Performance)
- Sources of Municipal Water Pollution Control Plant Raw Sewage
- Operational Evaluation for Oakville (Southeast) WPCP
- Analytical Data


INFLUENT
Influent Sample
DESIGN:
FLOW: 22 730 m³/d
BOD: 175 mg/l
SS: 150 mg/l
TP: 7 mg/l
BY-PASS TO LAKE ONTARIO
AERATED GRIT REMOVAL
NUMBER: (1) TANK
DIMENSIONS: 16.2x4.3x3.7 m
VOLUME: 238 m³
HRT: 15 min (design)
SCREENING
BARMINUTORS: (2)
CAPACITY: 45000 m³ each
BAR SCREENS: (1) MECHANICALLY CLEANED
Supernatant
Waste Activated Sludge
PRIMARY CLARIFIERS
OLD
NEW
NUMBER
(2) TANKS
(2) TANKS
DIMENSIONS
14.3x9.8x3.6 m
14.3x16.5x3.6 m
TOTAL VOL
980 m³
1882 m³
SURF. AREA
280 m²
472 m²
RET. TIME
2.6 hr (design)
2.9 hr (design)
Raw Sludge Sample
Raw Sludge
By-Pass
RAS
DIGESTERS
OLD
NEW
NUMBER PRIMARY:
(1)
(1)
SECOND:
(1)
(1)
DETENTION
47 days based on 4% SOLIDS
Digested Sludge Sample
DIGESTED SLUDGE FOR LAND APPLICATION
AERATION SYSTEM
OLD
NEW
TYPE
CAS
CAS
NUMBER
(2) CELLS
(2) CELLS
DIMENSIONS
10.2x4.6x4.6 m
17.2x4.6x4.6 m
TOTAL VOL
1776 m³
3019 m³
HRT (design)
4.6 hr
5.2 hr
ALUM ADDITION FOR P REMOVAL
SECONDARY CLARIFIERS
OLD
NEW
NUMBER
(3) TANKS
(2) TANKS
DIMENSIONS
(2) 16.3x9.8x3.3 m
(1) 16.3x6.5x3.3 m
23.9x16.8x3.3 m
TOTAL VOL
1495 m³
2650 m³
SURF. AREA
450 m²
800 m²
RET. TIME
5.9 hr
4.6 hr
WEIR RATE
92 m³/m-d (design)
103 m³/m-d (design)
Parshall Flume
Venturi Flume
CHLORINATION
CONTACT TIME: 30 min (design)
DOSAGE: 1.4 mg/l (May, 1987)
Effluent Sample
Rectangular Weir
EFFLUENT TO LAKE ONTARIO
OAKVILLE (S.E.) WPCP
CANVIRO

SOUTH EAST WPCP
Conventional Activated Sludge
Phosphorus Removal - Continuous
Capacity - 22.738 10(3)m3/day

PARAMETER	1981	1982	1983	1984	1985	5 YEAR AVERAGE 81-85
Avg. Daily Flow (1000 m3/day)	12.86	11.82	12.37	12.49	[illegible]	[illegible]
BOD5 - Influent (mg/L)	160.60	140.60	190.00	146.83	160.91	161.26
BOD5 - Effluent (mg/L)	2.20	2.70	2.40	3.93	2.55	2.76
Annual BOD5 Significantly Different from Mean Annual Average BOD5?	I.D.	I.D.	I.D.	I.D.	I.D.	
TSS - Influent (mg/L)	185.90	163.00	179.00	188.17	230.91	180.69
TSS - Effluent (mg/L)	7.10	9.10	5.00	7.20	8.21	7.49
Annual TSS Significantly Different from Mean Annual Average TSS?	I.D.	I.D.	I.D.	I.D.	I.D.	
Total P - Influent (mg/L)	7.40	6.91	7.70	8.15	9.49	7.90
Total P - Effluent (mg/L)	0.04	0.75	0.96	0.87	0.86	0.86
Annual TP Significantly Different from Mean Annual Average TP?	I.D.	I.D.	I.D.	I.D.	I.D.	
TP in Compliance?	Y	Y	Y	Y	Y	Y

I.D. - Insufficient Data

R

SOURCES OF MUNICIPAL WATER POLLUTION CONTROL PLANT RAW SEWAGE

GENERAL DESCRIPTION OF WATER POLLUTION CONTROL PLANT (WPCP)

NAME OF WPCP	OAKVILLE SOUTHEAST WPCP
WORKS NUMBER	120000998
TREATMENT TYPE	CONVENTIONAL ACTIVATED SLUDGE PHOSPHORUS REMOVAL CONTINUOUS
DESIGN CAPACITY (1000 m3/d)	22.730
1986 AVERAGE DAY FLOW (1000 m3/d)	13.086
POPULATION SERVED	21900

% OF TOTAL FLOW ATTRIBUTED TO:

INDUSTRIAL SOURCES (%)	0.4
COMMERCIAL SOURCES (%) (Population x 0.0757)	13
RESIDENTIAL SOURCES (%) (Population x 0.175)	29
UNACCOUNTED FOR, INCL. INFILTRATION (100-% Contributed from industrial, commercial and residential sources)	58

PROFILE OF INDUSTRIES IN CATCHMENT

TOTAL NO OF INDUSTRIES	312
INDUSTRIES WITH WATER	32
NO OF SIC CATEGORIES	42

DESCRIPTION OF THE TOP 5 INDUSTRIES DISCHARGED TO THE WPCP (BASED ON WATER USE DATA)

DESCRIPTION	SIC	# OF COMPANIES
PHOTOGRAPHIC CHEMICALS	3861-3861	2
TRANSPORTATION EQ'T	3711-3799	24
PRIMARY TEXTILE	2211-2269	3
PHARMACEUTICAL	2830-2834	1
COIL COATING	3479-3479	5

R

OPERATIONAL EVALUATION FOR: OAKVILLE (SOUTH-EAST) WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: June 12, 1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 22,730 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
RAW SEWAGE FLOW	12,820	12,560	12,630	12,640	12,400	12,390	12,780
% of Design Flow	56.40%	55.26%	55.57%	55.61%	54.55%	54.51%	56.23%
Influent BOD (mg/L)	175.0						
Primary BOD (mg/L)	41.0						
Secondary BOD (mg/L)	1.0						
% PRIMARY REMOVAL	76.6%						
% SECONDARY REMOVAL	99.4%						
Influent SS (mg/L)	77.0						
Primary SS (mg/L)	68.0						
Secondary SS (mg/L)	20.0						
% PRIMARY REMOVAL	11.7%						
% SECONDARY REMOVAL	74.0%						
Influent NH4 (mg/L)	19.0						
Primary NH4 (mg/L)	34.7						
Secondary NH4 (mg/L)	15.4						
% PRIMARY REMOVAL	-82.6%						
% SECONDARY REMOVAL	18.9%						
Influent TKN (mg/L)	19.2						
Primary TKN (mg/L)	36.8						
Secondary TKN (mg/L)	16.7						
% PRIMARY REMOVAL	-91.7%						
% SECONDARY REMOVAL	13.0%						
Influent Total P (mg/L)	6.80						
Primary Total P (mg/L)	4.60						
Secondary Total P (mg/L)	0.80						
% PRIMARY REMOVAL	32.4%						
% SECONDARY REMOVAL	88.2%						

OPERATIONAL EVALUATION FOR: OAKVILLE (SOUTH-EAST) WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: June 12, 1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 22,730 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 8	DAY 9	DAY 10	DAY 11	DAY 12	DAY 13	DAY 14
RAW SEWAGE FLOW	12,510	11,600	11,820	11,800	12,073	11,821	12,410
% of Design Flow	55.04%	51.03%	52.00%	51.91%	53.11%	52.01%	54.60%
Influent BOD (mg/L)							176.0
Primary BOD (mg/L)			52.0	51.0			37.0
Secondary BOD (mg/L)			4.0	2.0			1.0
% PRIMARY REMOVAL							79.0%
% SECONDARY REMOVAL							99.4%
Influent SS (mg/L)							328.0
Primary SS (mg/L)			18.0	48.0			46.0
Secondary SS (mg/L)			9.0	6.0			4.0
% PRIMARY REMOVAL							86.0%
% SECONDARY REMOVAL							98.8%
Influent NH4 (mg/L)							
Primary NH4 (mg/L)			7.4	28.6			
Secondary NH4 (mg/L)			11.5	7.8			
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)			12.8	26.5			
Secondary TKN (mg/L)			15.2	17.6			
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)							12.40
Primary Total P (mg/L)			3.80	5.80			9.80
Secondary Total P (mg/L)			0.40	0.40			0.70
% PRIMARY REMOVAL							21.0%
% SECONDARY REMOVAL							94.4%

OPERATIONAL EVALUATION FOR: O A K V I L L E (S O U T H - E A S T) W P C P

TREATMENT FACILITY: Secondary
PERIOD ENDING: June 12, 1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 22,730 m3/d

PARAMETER	SAMPLING PERIOD						
	DAY 15	DAY 16	DAY 17	DAY 18	DAY 19	DAY 20	DAY 21
RAW SEWAGE FLOW	12,980	12,400	10,780	12,320	12,937		
% of Design Flow	57.11%	54.55%	47.43%	54.20%	56.92%		
Influent BOD (mg/L)							
Primary BOD (mg/L)	1225.0		56.0	89.0			
Secondary BOD (mg/L)	3.0		4.0	6.0			
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent SS (mg/L)							
Primary SS (mg/L)							
Secondary SS (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent NH4 (mg/L)							
Primary NH4 (mg/L)	26.8		24.1	30.4			
Secondary NH4 (mg/L)	21.0		9.5	10.9			
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)	26.2		24.0	41.5			
Secondary TKN (mg/L)			8.8	9.4			
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)							
Primary Total P (mg/L)	4.40		2.40	3.10			
Secondary Total P (mg/L)			0.60	0.60			
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							

PLANT NAME : Oakville (Southeast)
PLANT TYPE : Secondary

SAMPLING TYPE : Raw Sewage
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0	127.00	173.00	5	5	100.0	267	266	99.6	150.03	140.23	1.14	1.93	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0	120.00	376.00	5	5	100.0	260	258	99.2	270.85	287.75	1.60	1.82	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0	16.50	24.50	5	5	100.0	271	271	100.0	20.45	22.39	1.19	1.81	100.0
NH4TPR	AMMONIUM,TOTAL PRLT.REAC.	mg/L	0	20.40	24.60	5	5	100.0	275	274	99.6	21.91	15.37	1.08	1.69	100.0
NHTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0	26.30	33.80	5	5	100.0	273	273	100.0	29.28	25.44	1.10	1.47	100.0
PH	(-LOG(H+(CONCN))		0	6.81	7.22	5	5	100.0	275	275	100.0	7.06	6.90	1.02	1.05	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0	108.00	172.00	5	5	100.0	267	266	99.6	144.82	126.88	1.20	1.93	100.0
RSPLOI	RESIDUE,PAR.LOSS ON IGNI.	mg/L	0	78.70	128.00	5	5	100.0	90	89	98.9	102.01	100.84	1.20	1.78	100.0
METALS																
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	980.00	1460.00	6	6	100.0	322	306	95.0	1160.00	1000.10	1.15	2.65	97.3
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	30.00	50.00	6	6	100.0	322	237	73.6	40.00	51.10	1.21	3.44	89.2
CUUT	COPPER,UNFILT.TOTAL	ug/L	0	90.00	90.00	1	1	100.0	49	48	98.0	90.00	110.60	0.00	2.20	97.1
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	0.14	0.26	5	5	100.0	283	274	96.8	0.20	0.23	1.23	2.11	100.0
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	440.00	580.00	6	6	100.0	319	318	99.7	510.00	370.70	1.11	2.14	100.0
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	60.00	1200.00	6	6	100.0	322	315	97.8	150.00	211.00	2.90	2.94	100.0
NIUT	NICKEL,UNFILT.TOTAL	ug/L	0	30.00	50.00	6	5	83.3	322	103	32.0	30.00	38.80	1.82	2.70	54.1
PBUT	LEAD,UNFILT.TOTAL	ug/L	0	70.00	110.00	6	3	50.0	322	57	17.7	50.00	59.50	1.80	1.86	51.4
CDUT	CADMIUM,UNFILT.TOTAL	ug/L	0	10.00	10.00	6	1	16.7	322	76	23.6	0.00	6.50	1.33	2.09	70.3
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PH04CRE	M-CRESOL	ug/L	1	17.30	38.30	5	5	100.0	275	167	60.7	25.69	25.59	1.35	3.45	86.5
PESTICIDES,HERBICIDES,PCBS																
P1BHCG	GAMMA-BHC(HEXCHLORCYCLHEXANE)	ug/L	2	0.03	0.06	5	3	60.0	276	143	51.8	0.02	0.02	2.36	2.29	94.6
P524D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	0.08	0.16	5	3	60.0	276	214	77.5	0.05	0.13	2.40	3.72	108.0

PLANT NAME : Oakville (Southeast)
PLANT TYPE : Secondary

SAMPLING TYPE : Final Effluent
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	STD. FOR SURFACE WATER	STD. REF.	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET.	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																		
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0		-	11.30	22.00	5	5	100.0	213	211	99.1	15.06	21.22	1.34	2.07	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0		-	42.00	62.00	5	5	100.0	213	211	99.1	49.14	52.80	1.16	1.83	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0		-	6.80	8.30	5	5	100.0	220	220	100.0	7.22	8.09	1.09	1.60	100.0
NNHTPR	AMMONIUM,TOTAL FIL.T.REAC.	mg/L	0		-	14.30	21.50	4	4	100.0	223	204	91.5	18.17	3.90	1.21	6.98	100.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0		-	13.40	23.30	4	4	100.0	222	222	100.0	16.81	7.97	1.28	2.71	100.0
PH	(-LOG(H+(CONCN))		0		-	6.96	7.28	5	5	100.0	224	224	100.0	7.15	7.10	1.02	1.05	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0		-	7.70	12.00	5	5	100.0	220	219	99.6	10.05	10.12	1.19	2.00	100.0
NNO2PR	NITRITE,FIL.T. REACT.	mg/L	0		-	0.48	1.79	5	4	80.0	220	194	88.2	0.32	0.22	15.87	5.95	96.4
NNOTPR	NITRATES,TOTAL FIL.T.REAC.	mg/L	0		-	1.80	8.30	5	4	80.0	224	186	83.0	1.90	2.33	8.36	7.75	96.4
RSPLOI	RESIDUE,PART.LOSS ON IGNI.	mg/L	0		-	5.60	7.50	5	4	80.0	77	58	75.3	5.34	7.47	1.67	2.71	93.3
METALS																		
ALUT	ALUMINUM,UNFIL.T.TOTAL	ug/L	0	75.00	ONT-MOE	1100.00	1300.00	6	6	100.0	264	196	74.2	1200.00	101.70	1.05	3.72	96.4
CUUT	COPPER,UNFIL.T.TOTAL	ug/L	0	5.00	ONT-MOE	10.00	10.00	1	1	100.0	47	30	63.8	10.00	13.10	0.00	2.56	77.8
HGUT	MERCURY,UNFIL.T.TOTAL	ug/L	0	0.20	ONT-MOE	0.01	0.02	5	5	100.0	233	220	94.4	0.02	0.03	1.46	2.62	100.0
SRUT	STRONTIUM,UNFIL.T.TOTAL	ug/L	0	3750.00	ONT-MOE	350.00	400.00	6	6	100.0	267	267	100.0	380.00	340.90	1.06	2.14	100.0
ZNUT	ZINC,UNFIL.T.TOTAL	ug/L	0	30.00	ONT-MOE	30.00	50.00	6	6	100.0	267	262	98.1	40.00	53.30	1.29	2.48	100.0
NIUT	NICKEL,UNFIL.T.TOTAL	ug/L	0	25.00	ONT-MOE	20.00	30.00	6	5	83.3	267	171	64.0	20.00	22.10	1.86	3.60	85.7
COUT	COBALT,UNFIL.T.TOTAL	ug/L	0	5.00	NYS-STD	10.00	10.00	6	2	33.3	266	65	24.4	10.00	6.40	1.43	1.54	82.1
CDUT	CADMIUM,UNFIL.T.TOTAL	ug/L	0	0.20	ONT-MOE	0.00	0.00	6	1	16.7	267	65	24.3	0.00	2.10	1.43	2.07	71.4
MOUT	MOLYBDENUM,UNFIL.T.TOTAL	ug/L	0		-	10.00	10.00	6	1	16.7	267	75	28.1	10.00	6.60	1.33	1.56	67.9
PESTICIDES,HERBICIDES,PCBS																		
P1BHCG	GAMMA-BHC(HEXCHLORCYCLHEXANE)	ug/L	2	0.06	ONT-MOE	0.02	0.03	5	4	80.0	227	157	69.2	0.02	0.02	2.09	2.48	96.4
P24D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	4.00	ONT-MOE	0.08	0.28	5	4	80.0	227	177	78.0	0.08	0.08	3.57	4.71	100.0

PLANT NAME : Oakville (Southeast) **SAMPLING TYPE : Raw Sludge**
PLANT TYPE : Secondary **SAMPLE FORM : Dry Weight**

CONTAM-INANT	CONTAMINANT NAME	UNITS (DRY WEIGHT)	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
COD	CHEMICAL OXYGEN DEMAND	mg/kg	0	1144000.00	1144000.00	1	1	100.0	45	45	100.0	1144000.00	892221.45	0.00	3.19	100.0
NH3TPR	AMMONIUM,TOTAL PR.T.REAC.	mg/kg	0	13600.00	13600.00	1	1	100.0	48	47	97.9	13600.00	5911.32	0.00	4.59	100.0
NN3TPR	NITRATES,TOTAL PR.T.REAC.	mg/kg	0	32.00	32.00	1	1	100.0	48	43	89.6	32.00	25.44	0.00	2.21	93.9
NNTKUR	NITROGEN-TOT-KJEL,UNP.TOT	mg/kg	0	46000.00	46000.00	1	1	100.0	51	51	100.0	46000.00	36897.85	0.00	2.98	100.0
PH	(-LOG(H+(CONCN))	mg/kg	0	6.35	6.35	1	1	100.0	49	49	100.0	6.35	6.03	0.00	1.10	100.0
PHENOL	PHENOLICS (4AAP)	mg/kg	0	240.00	240.00	1	1	100.0	50	41	82.0	240.00	82.34	0.00	3.54	85.3
RST	RESIDUE, TOTAL	mg/kg	0	25000.00	25000.00	1	1	100.0	51	51	100.0	25000.00	32783.51	0.00	1.81	100.0
RSTLOI	RESIDUE,TOT.LOSS ON IGNI.	mg/kg	0	12069.00	12069.00	1	1	100.0	51	51	100.0	12069.00	20803.08	0.00	1.77	100.0
METALS																
ALUT	ALUMINUM,UNFIL.T.TOTAL.	mg/kg	0	52000.00	52000.00	1	1	100.0	51	51	100.0	52000.00	9835.74	0.00	2.51	100.0
ASUT	ARSENIC,UNFIL.T.TOTAL.	mg/kg	0	3.60	3.60	1	1	100.0	51	50	98.0	3.60	6.15	0.00	2.01	97.1
CDUT	CADMIUM,UNFIL.T.TOTAL.	mg/kg	0	3.76	3.76	1	1	100.0	43	40	93.0	1.76	9.74	0.00	4.35	90.0
COUT	COBALT,UNFIL.T.TOTAL.	mg/kg	0	15.60	15.60	1	1	100.0	41	30	73.2	15.60	9.29	0.00	4.69	73.3
CRUT	CHROMIUM,UNFIL.T.TOTAL.	mg/kg	0	152.00	152.00	1	1	100.0	51	50	98.0	152.00	301.43	0.00	3.68	97.1
CUUT	COPPER,UNFIL.T.TOTAL.	mg/kg	0	364.00	364.00	1	1	100.0	46	46	100.0	364.00	606.31	0.00	1.72	100.0
HGUT	MERCURY,UNFIL.T.TOTAL.	mg/kg	0	1.20	1.20	1	1	100.0	50	50	100.0	1.20	2.23	0.00	1.67	100.0
MOUT	MOLYBDENUM,UNFIL.T.TOTAL.	mg/kg	0	5.20	5.20	1	1	100.0	37	23	62.2	5.20	5.80	0.00	2.88	64.3
NIUT	NICKEL,UNFIL.T.TOTAL.	mg/kg	0	48.00	48.00	1	1	100.0	46	44	95.7	48.00	59.17	0.00	2.90	93.3
PBUT	LEAD,UNFIL.T.TOTAL.	mg/kg	0	52.00	52.00	1	1	100.0	49	48	98.0	52.00	173.99	0.00	2.24	96.9
SEUT	SELENIUM,UNFIL.T.TOTAL.	mg/kg	0	2.80	2.80	1	1	100.0	50	48	96.0	2.80	3.04	0.00	1.93	93.9
SRUT	STRONTIUM,UNFIL.T.TOTAL.	mg/kg	0	312.00	312.00	1	1	100.0	51	51	100.0	312.00	231.70	0.00	1.97	100.0
ZNUT	ZINC,UNFIL.T.TOTAL.	mg/kg	0	348.00	348.00	1	1	100.0	51	51	100.0	348.00	905.39	0.00	2.39	100.0
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PMMCRE	M-CRESOL	ug/kg	1	616000.00	616000.00	1	1	100.0	51	42	82.3	616000.00	116847.30	0.00	12.16	85.3
PMPHEN	PHENOL	ug/kg	2	52000.00	52000.00	1	1	100.0	51	15	29.4	52000.00	7312.80	0.00	3.00	38.2
PESTICIDES,HERBICIDES,PCBS																
P1BHCG	GAMMA-BHC(HEXCHLORCYCLOHEXANE)	ug/kg	2	12.00	12.00	1	1	100.0	51	28	54.9	12.00	8.90	0.00	2.69	67.7
P1CHLA	ALPHA-CHLORDANE	ug/kg	1	12.00	12.00	1	1	100.0	51	18	35.3	12.00	5.90	0.00	2.38	47.1
P1CHLG	GAMMA-CHLORDANE	ug/kg	1	16.00	16.00	1	1	100.0	51	19	37.3	16.00	6.00	0.00	2.44	50.0
P1PCBT	PCB, TOTAL	ug/kg	2	100.00	100.00	1	1	100.0	51	40	78.4	100.00	88.70	0.00	3.18	79.4
P1PPDE	PP-DDE	ug/kg	1	12.00	12.00	1	1	100.0	51	22	43.1	12.00	7.30	0.00	2.31	52.9
P3SILV	SILVEX	ug/kg	3	48.00	48.00	1	1	100.0	51	23	45.1	48.00	47.30	0.00	3.40	55.9

PLANT NAME : Oakville (Southeast) **SAMPLING TYPE : Treated Sludge**
PLANT TYPE : Secondary **SAMPLE FORM : Dry Weight**

CONTAM-INANT	CONTAMINANT NAME	UNITSQA/QC (DRY WEIGHT)	CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
COD	CHEMICAL OXYGEN DEMAND	mg/kg	0	683908.05	683908.05	1	1	100.0	36	36	100.0	683908.05	508097.94	0.00	4.65	100.0
NNHTFR	AMMONIUM,TOTAL FIL.T.REAC.	mg/kg	0	15919.54	15919.54	1	1	100.0	25	25	100.0	15919.54	17658.28	0.00	2.92	100.0
NNOTFR	NITRATES,TOTAL FIL.T.REAC.	mg/kg	0	34.48	34.48	1	1	100.0	26	23	88.5	34.48	42.68	0.00	2.29	95.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/kg	0	43965.52	43965.52	1	1	100.0	49	49	100.0	43965.52	38494.12	0.00	1.77	100.0
PH	(-LOG(H+(CONCN))	mg/kg	0	7.33	7.33	1	1	100.0	47	47	100.0	7.33	7.17	0.00	1.09	100.0
RST	RESIDUE, TOTAL	mg/kg	0	34800.00	34800.00	1	1	100.0	50	50	100.0	34800.00	80434.06	0.00	3.23	100.0
RSTLOI	RESIDUE,TOT LOSS ON IGNI.	mg/kg	0	16800.00	16800.00	1	1	100.0	50	50	100.0	16800.00	43379.33	0.00	3.19	100.0
METALS																
AGUT	SILVER,UNFIL.T.TOTAL.	mg/kg	0	24.43	24.43	1	1	100.0	44	44	100.0	24.43	37.78	0.00	2.33	100.0
ALUT	ALUMINUM,UNFIL.T.TOTAL.	mg/kg	0	63218.39	63218.39	1	1	100.0	50	50	100.0	63218.39	10715.94	0.00	2.82	100.0
ASUT	ARSENIC,UNFIL.T.TOTAL.	mg/kg	0	3.74	3.74	1	1	100.0	50	49	98.0	3.74	5.40	0.00	2.06	97.1
CDUT	CADMIUM,UNFIL.T.TOTAL.	mg/kg	0	3.16	3.16	1	1	100.0	45	41	91.1	3.16	10.47	0.00	3.98	90.3
COUT	COBALT,UNFIL.T.TOTAL.	mg/kg	0	21.84	21.84	1	1	100.0	39	32	82.1	21.84	9.14	0.00	2.75	85.7
CRUT	CHROMIUM,UNFIL.T.TOTAL.	mg/kg	0	178.16	178.16	1	1	100.0	50	50	100.0	178.16	333.06	0.00	3.59	100.0
CUUT	COPPER,UNFIL.T.TOTAL.	mg/kg	0	545.98	545.98	1	1	100.0	45	45	100.0	545.98	732.24	0.00	2.16	100.0
HGUT	MERCURY,UNFIL.T.TOTAL.	mg/kg	0	2.30	2.30	1	1	100.0	50	49	98.0	2.30	3.24	0.00	2.04	97.1
MOUT	MOLYBDENUM,UNFIL.T.TOTAL.	mg/kg	0	7.76	7.76	1	1	100.0	34	23	67.7	7.76	6.41	0.00	2.84	69.2
NIUT	NICKEL,UNFIL.T.TOTAL.	mg/kg	0	86.21	86.21	1	1	100.0	45	42	93.3	86.21	72.95	0.00	2.95	90.0
PBUT	LEAD,UNFIL.T.TOTAL.	mg/kg	0	114.94	114.94	1	1	100.0	50	49	98.0	114.94	196.62	0.00	2.46	97.1
SEUT	SELENIUM,UNFIL.T.TOTAL.	mg/kg	0	3.74	3.74	1	1	100.0	50	48	96.0	3.74	2.67	0.00	2.98	97.1
SRUT	STRONTIUM,UNFIL.T.TOTAL.	mg/kg	0	431.03	431.03	1	1	100.0	50	50	100.0	431.03	240.93	0.00	2.54	100.0
ZNUT	ZINC,UNFIL.T.TOTAL.	mg/kg	0	459.77	459.77	1	1	100.0	50	50	100.0	459.77	988.90	0.00	2.57	100.0
DIOXINS AND FURANS																
P8CDD	OCTACHLORODIBENZODIOXIN	ug/kg	1	2.10	2.10	1	1	100.0	49	26	53.1	2.10	7.10	0.00	3.84	64.7
PESTICIDES,HERBICIDES,PCBS																
P1CHLA	ALPHA-CHLORDANE	ug/kg	1	17.20	17.20	1	1	100.0	50	22	44.0	17.20	6.50	0.00	2.41	55.9
P1CHLG	GAMMA-CHLORDANE	ug/kg	1	17.20	17.20	1	1	100.0	50	21	42.0	17.20	6.80	0.00	2.58	52.9
P1PCBT	PCB, TOTAL	ug/kg	2	117.80	117.80	1	1	100.0	50	32	64.0	117.80	114.10	0.00	4.58	67.7
P1PPDR	PP-DDE	ug/kg	1	8.60	8.60	1	1	100.0	50	34	68.0	8.60	11.10	0.00	2.72	73.5
P3245T	2,4,5-TRICHLOROPHENOXYACETIC ACID	ug/kg	3	402.30	402.30	1	1	100.0	50	16	32.0	402.30	86.40	0.00	3.13	41.2
P324D	2,4-DICHLOROPHENOXYACETIC ACID	ug/kg	3	1293.10	1293.10	1	1	100.0	50	25	50.0	1293.10	75.00	0.00	5.81	64.7
P5SILV	SILVEX	ug/kg	3	186.80	186.80	1	1	100.0	50	18	36.0	186.80	92.70	0.00	2.94	44.1
X2124	1,2,4-TRICHLOROBENZENE	ug/kg	3	14.40	14.40	1	1	100.0	50	22	44.0	14.40	14.80	0.00	5.02	52.9

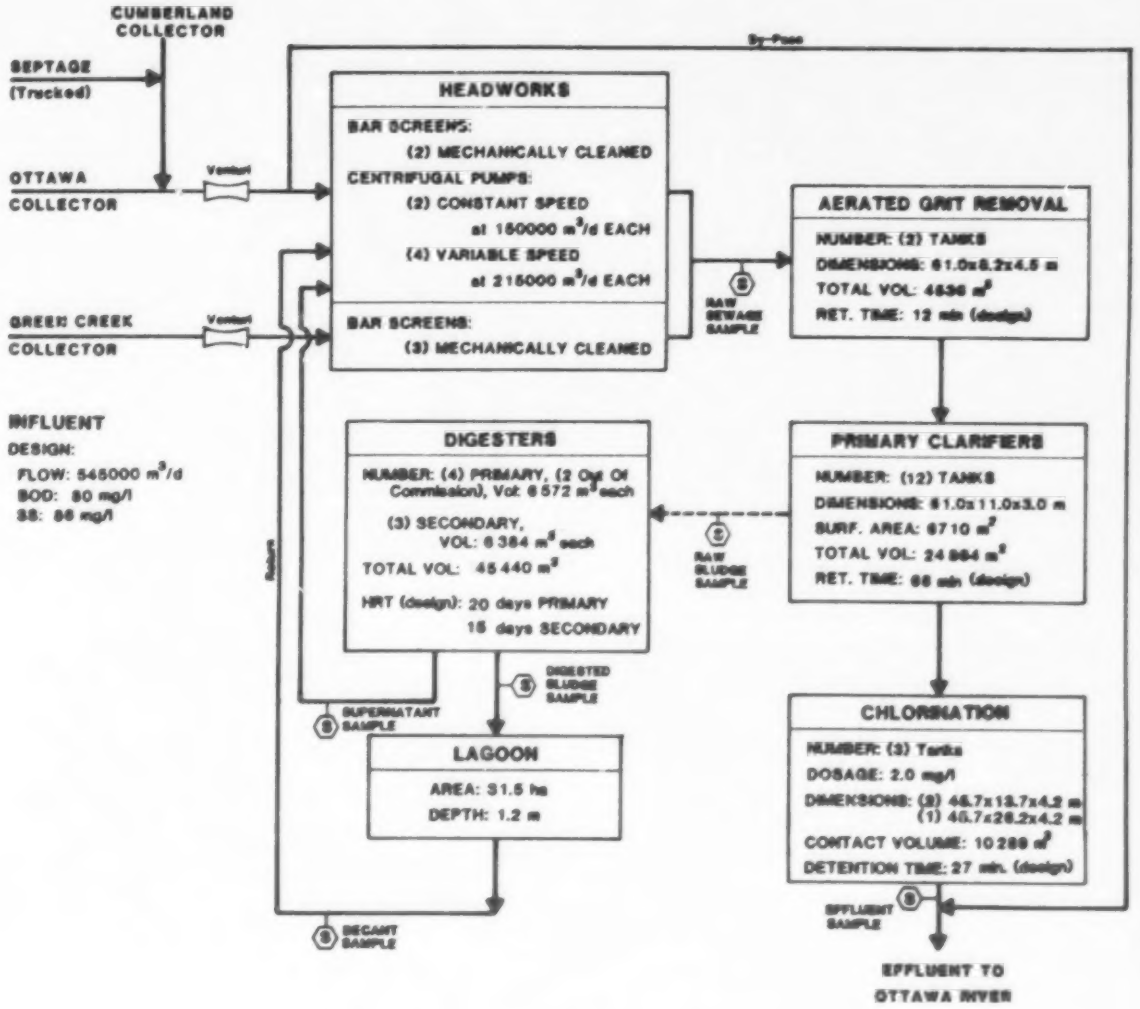
Sub-Appendix A-20

Ottawa (Green Creek) WPCP

Contents:

- Plant Schematic with Design Characteristics
- Sources of Municipal Water Pollution Control Plant Raw Sewage
- Operational Evaluation for Ottawa (Green Creek) WPCP
- Analytical Data

(KIR18/28A)



1. Approximately 20 trucks of septage, 190000 l, is discharged to the Cumberland Collector per day.
2. Plant personnel feel that the recorded flow is approximately 10% greater than the actual flow.
3. New Chlorine Contact Chamber in use at time of study (vol: 9099 m³). Existing chambers under repair.
4. Two of the Primary Digesters were not in use at the time of sampling.
5. Two of the twelve Primary Clarifiers were out of service at time of sampling.

OTTAWA (GREEN CREEK) WPCP

CANVIRO

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SOURCES OF MUNICIPAL WATER POLLUTION CONTROL PLANT RAW SEWAGE

GENERAL DESCRIPTION OF WATER POLLUTION CONTROL PLANT (WPCP)

NAME OF WPCP	GREENS CREEK WPCP
WORKS NUMBER	120000729
TREATMENT TYPE	PRIMARY PHOSPHORUS REMOVAL CONTINUOUS
DESIGN CAPACITY (1000 m3/d)	363.680
1986 AVERAGE DAY FLOW (1000 m3/d)	418.250
POPULATION SERVED	450000

% OF TOTAL FLOW ATTRIBUTED TO:

INDUSTRIAL SOURCES (%)	3
COMMERCIAL SOURCES (%) (Population x 0.0757)	8
RESIDENTIAL SOURCES (%) (Population x 0.175)	19
UNACCOUNTED FOR, INCL. INFILTRATION (100-% Contributed from industrial, commercial and residential sources)	70

PROFILE OF INDUSTRIES IN CATCHMENT

TOTAL NO OF INDUSTRIES	450
INDUSTRIES WITH WATER	211
NO OF SIC CATEGORIES	40

DESCRIPTION OF THE TOP 5 INDUSTRIES DISCHARGED TO THE WPCP
(BASED ON WATER USE DATA)

DESCRIPTION	SIC	# OF COMPANIES
PRINTING AND PUBLISHING	2700-2799	69
BEVERAGES	2082-2087	2
MACHINERY MFG	3500-3599	45
DAIRY	2021-2026	2
ELECTRICAL & ELECTRONIC COMPONENTS	3612-3690	27

OPERATIONAL EVALUATION FOR: OTTAWA (GREEN CREEK) WPCP

TREATMENT FACILITY: Primary
PERIOD ENDING: July 19,1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 545,000 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
RAW SEWAGE FLOW			412,000	415,000	411,000	413,000	394,000
% of Design Flow			75.60%	76.15%	75.41%	75.78%	72.29%
Influent BOD (mg/L)					70.0	105.0	
Primary BOD (mg/L)					28.0	39.0	
Secondary BOD (mg/L)							
% PRIMARY REMOVAL					60.0	62.9	
% SECONDARY REMOVAL							
Influent SS (mg/L)			74.0	84.0	92.0	72.0	68.0
Primary SS (mg/L)			23.0	36.0	45.0	19.0	18.0
Secondary SS (mg/L)							
% PRIMARY REMOVAL			68.9	57.1	51.1	73.6	73.5
% SECONDARY REMOVAL							
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)			2.9	3.0	3.1	2.8	2.7
Primary Total P (mg/L)			2.5	2.6	2.7	2.3	2.2
Secondary Total P (mg/L)							
% PRIMARY REMOVAL			15.3	13.6	14.6	16.7	16.1
% SECONDARY REMOVAL							

OPERATIONAL EVALUATION FOR: OTTAWA (GREEN CREEK) WPCP

TREATMENT FACILITY: Primary
PERIOD ENDING: July 19,1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 545,000 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 8	DAY 9	DAY 10	DAY 11	DAY 12	DAY 13	DAY 14
RAW SEWAGE FLOW	405,000	406,000	393,000	346,000	434,000	424,000	400,000
% of Design Flow	74.31%	74.50%	72.11%	63.49%	79.63%	77.80%	73.39%
Influent BOD (mg/L)			90.0	86.0			
Primary BOD (mg/L)			39.0	26.0			
Secondary BOD (mg/L)							
% PRIMARY REMOVAL			56.7	69.8			
% SECONDARY REMOVAL							
Influent SS (mg/L)			98.0	98.0			2.5
Primary SS (mg/L)			59.0	33.0			1.8
Secondary SS (mg/L)							
% PRIMARY REMOVAL			39.8	66.3			28.0
% SECONDARY REMOVAL							
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)			3.4	3.2			2.5
Primary Total P (mg/L)			3.2	2.6			1.8
Secondary Total P (mg/L)							
% PRIMARY REMOVAL			7.6	19.0			28.0
% SECONDARY REMOVAL							

OPERATIONAL EVALUATION FOR: OTTAWA (GREEN CREEK) WPCP

TREATMENT FACILITY: Primary
PERIOD ENDING: July 24,1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 545,000 m3/d

PARAMETER	SAMPLING PERIOD DAY 15	DAY 16	DAY 17	DAY 18	DAY 19	DAY 20	DAY 21
RAW SEWAGE FLOW	425,000	421,000	425,000	446,000	450,000	460,000	422,000
% of Design Flow	77.98%	77.25%	77.98%	81.83%	82.57%	84.40%	77.43%
Influent BOD (mg/L)		50.0	85.0	57.0			
Primary BOD (mg/L)		29.0	34.0	27.0			
Secondary BOD (mg/L)							
% PRIMARY REMOVAL		42.0	60.0	52.6			
% SECONDARY REMOVAL							
Influent SS (mg/L)	113.0	89.0	111.0	65.0	42.0	55.0	46.0
Primary SS (mg/L)	20.0	30.0	15.0	27.0	14.0	11.0	20.0
Secondary SS (mg/L)							
% PRIMARY REMOVAL	82.3	66.3	86.5	58.5	66.7	80.0	56.5
% SECONDARY REMOVAL							
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)	2.8	2.6	3.2	2.9	2.7	2.8	2.6
Primary Total P (mg/L)	1.9	2.4	2.2	2.3	2.3	2.2	2.5
Secondary Total P (mg/L)							
% PRIMARY REMOVAL	31.2	9.1	33.2	22.0	16.0	20.4	5.8
% SECONDARY REMOVAL							

PLANT NAME : Ottawa (Green Creek)
PLANT TYPE : Primary

SAMPLING TYPE : Raw Sewage
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0	23.20	91.00	5	5	100.0	267	266	99.6	47.93	140.23	1.79	1.93	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0	84.00	138.00	5	5	100.0	260	258	99.2	109.06	287.75	1.22	1.82	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0	11.00	15.00	5	5	100.0	271	271	100.0	12.83	22.39	1.12	1.81	100.0
NNHTPR	AMMONIUM,TOTAL FILT.REAC.	mg/L	0	9.50	13.00	5	5	100.0	275	274	99.6	11.16	15.37	1.14	1.69	100.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0	14.00	16.00	5	5	100.0	273	273	100.0	15.22	25.44	1.06	1.47	100.0
PH	(-LOG(H+(CONCN))		0	6.41	6.54	5	5	100.0	275	275	100.0	6.49	6.90	1.01	1.05	100.0
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/L	0	2.60	2.90	5	5	100.0	248	248	100.0	2.75	5.18	1.05	1.51	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0	33.00	91.10	5	5	100.0	267	266	99.6	49.54	126.88	1.49	1.93	100.0
RSPLOI	RESIDUE,PART.LOSS ON IGNI.	mg/L	0	25.20	50.20	5	5	100.0	90	89	98.9	35.00	100.84	1.30	1.78	100.0
PHNOL	PHENOLICS (4AAP)	mg/L	0	16.00	16.00	5	1	20.0	275	37	13.5	0.57	0.31	6.42	2.05	37.8
METALS																
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	30.00	40.00	6	6	100.0	322	237	73.6	30.00	51.10	1.16	3.44	89.2
CUUT	COPPER,UNFILT.TOTAL	ug/L	0	50.00	50.00	1	1	100.0	49	48	98.0	50.00	110.60	0.00	2.28	97.1
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	0.10	0.18	5	5	100.0	283	274	96.8	0.14	0.23	1.27	2.11	100.0
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	360.00	410.00	6	6	100.0	319	318	99.7	390.00	370.70	1.05	2.14	100.0
ZNUT	ZINC,UNFIL.T.TOTAL	ug/L	0	20.00	210.00	6	5	83.3	322	315	97.8	40.00	211.00	2.87	2.94	100.0
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	230.00	470.00	6	4	66.7	322	306	95.0	200.00	1000.10	1.81	2.65	97.3
AGUT	SILVER,UNFILT.TOTAL	ug/L	0	10.00	20.00	6	3	50.0	321	82	25.6	10.00	10.40	1.76	2.55	75.7
NIUT	NICKEL,UNFILT.TOTAL	ug/L	0	60.00	70.00	6	2	33.3	322	103	32.0	30.00	38.80	1.64	2.70	54.1
COUT	COBALT,UNFILT.TOTAL	ug/L	0	30.00	30.00	6	1	16.7	322	82	25.5	10.00	9.50	2.08	2.31	83.8
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PMMCRE	M-CRESOL	ug/L	1	17.50	58.60	5	3	60.0	275	167	60.7	17.58	25.59	2.43	3.45	86.5
PESTICIDES,HERBICIDES,PCBS																
P35ILV	SILVEX	ug/L	3	0.14	1.00	5	2	40.0	276	28	10.1	0.11	0.06	3.68	1.68	40.5
P324D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	0.33	0.33	5	1	20.0	276	214	77.5	0.04	0.13	3.50	3.72	100.0
VOLATILES ORGANIC COMPOUNDS																
X1TETR	TETRACHLOROETHYLENE	ug/L	1	60.00	60.00	5	1	20.0	274	12	4.4	24.91	21.51	1.63	1.53	18.9

PLANT NAME : Ottawa (Green Creek) **SAMPLING TYPE : Final Effluent**
PLANT TYPE : Primary **SAMPLE FORM : Wet Weight**

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	STD. FOR SURFACE WATER	STD. REF.	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET.	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																		
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0		-	8.20	59.00	5	5	100.0	40	40	100.0	22.47	48.40	2.55	2.05	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0		-	62.00	120.00	5	5	100.0	40	40	100.0	84.78	108.54	1.30	1.56	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0		-	10.70	13.30	5	5	100.0	40	40	100.0	11.60	12.80	1.10	1.40	100.0
NNHTPR	AMMONIUM,TOTAL FILT.REAC.	mg/L	0		-	9.05	11.90	5	5	100.0	40	40	100.0	10.63	10.46	1.13	1.66	100.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0		-	12.10	14.90	5	5	100.0	40	40	100.0	13.50	15.36	1.09	1.30	100.0
PH	(-LOG(H+(CONCN))		0		-	6.16	6.75	5	5	100.0	40	40	100.0	6.50	6.88	1.04	1.03	100.0
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/L	0		-	2.03	2.58	5	5	100.0	34	34	100.0	2.28	1.34	1.10	1.96	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0		-	14.80	23.60	5	5	100.0	39	39	100.0	18.22	29.57	1.19	1.73	100.0
RSPLOI	RESIDUE,PART.LOSS ON IGNI.	mg/L	0		-	12.80	17.90	5	5	100.0	10	10	100.0	15.42	28.16	1.15	1.95	100.0
PHNOL	PHENOLICS (4AAP)	mg/L	0	0.00	ONT-MOE	2.60	2.60	5	1	20.0	40	7	17.5	0.11	0.06	5.85	2.01	57.1
METALS																		
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	75.00	ONT-MOE	100.00	160.00	6	6	100.0	48	46	95.8	130.00	550.00	1.20	3.45	100.0
CUUT	COPPER,UNFILT.TOTAL	ug/L	0	5.00	ONT-MOE	20.00	20.00	1	1	100.0	8	7	87.5	20.00	18.20	0.00	1.85	100.0
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	0.20	ONT-MOE	0.08	0.09	5	5	100.0	39	38	97.4	0.08	0.05	1.05	2.42	100.0
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	3750.00	ONT-MOE	340.00	410.00	6	6	100.0	48	47	97.9	380.00	304.90	1.07	2.83	100.0
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	30.00	ONT-MOE	10.00	80.00	6	6	100.0	48	48	100.0	30.00	69.80	2.45	3.04	100.0
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	100.00	ONT-MOE	10.00	30.00	6	5	83.3	48	29	60.4	20.00	10.80	2.02	1.94	85.7
AGUT	SILVER,UNFILT.TOTAL	ug/L	0	0.10	ONT-MOE	10.00	10.00	6	4	66.7	48	8	16.7	10.00	6.40	1.43	1.61	57.1
COUT	COBALT,UNFILT.TOTAL	ug/L	0	5.00	NYS-STD	10.00	10.00	6	2	33.3	48	11	22.9	10.00	6.50	1.43	1.58	85.7
CDUT	CADMIUM,UNFILT.TOTAL	ug/L	0	0.20	ONT-MOE	0.00	0.00	6	1	16.7	48	18	37.5	0.00	2.50	1.33	1.96	85.7
MOUT	MOLYBDENUM,UNFILT.TOTAL	ug/L	0		-	20.00	20.00	6	1	16.7	48	11	22.9	10.00	6.60	1.76	1.66	71.4
NIUT	NICKEL,UNFILT.TOTAL	ug/L	0	25.00	ONT-MOE	30.00	30.00	6	1	16.7	48	10	20.8	10.00	8.70	2.08	2.86	57.1
PBUT	LEAD,UNFILT.TOTAL	ug/L	0	25.00	ONT-MOE	40.00	40.00	6	1	16.7	48	9	18.8	20.00	20.80	1.49	1.94	71.4
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																		
PMMCRE	M-CRESOL	ug/L	1		-	4.30	12.70	5	3	60.0	39	18	46.2	4.11	3.90	2.73	2.97	71.4
PESTICIDES,HERBICIDES,PCBS																		
PSILV	SILVEX	ug/L	3		-	0.09	0.09	5	1	20.0	40	9	22.5	0.03	0.03	1.77	2.19	57.1
VOLATILES ORGANIC COMPOUNDS																		
X1CHLO	CHLOROFORM	ug/L	1	0.20	NYS-STD	3.20	8.00	5	5	100.0	38	15	39.5	4.90	2.07	1.47	2.72	71.4
X1TETR	TETRACHLOROETHYLENE	ug/L	1	0.70	NYS-GUL	32.00	240.00	5	2	40.0	38	21	55.3	5.99	4.39	12.83	5.84	85.7
B2MPXY	M-, AND P-XYLENES	ug/L	1	50.00	NYS-GUL	2.20	2.20	5	1	20.0	38	10	26.3	1.17	1.83	1.42	3.42	85.7
B2OXYL	O-XYLENE	ug/L	1	100.00	ONT-MOE	2.80	2.80	5	1	20.0	38	13	34.2	1.23	1.94	1.58	3.05	85.7
X1TRIC	TRICHLOROETHYLENE	ug/L	1	3.00	NYS-GUL	16.00	16.00	5	1	20.0	38	7	18.4	1.74	1.71	3.46	3.60	42.9

PLANT NAME : Ottawa(Green Creek)
PLANT TYPE : Primary

SAMPLING TYPE : Recycle
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0	302.00	335.00	2	2	100.0	20	20	100.0	318.07	905.21	1.08	2.32	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0	500.00	500.00	1	1	100.0	39	39	100.0	500.00	3439.26	0.00	4.55	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0	168.00	198.00	3	3	100.0	42	42	100.0	177.46	77.62	1.10	3.54	100.0
NNHTFR	AMMONIUM,TOTAL FILT.REAC.	mg/L	0	280.00	594.00	3	3	100.0	44	44	100.0	440.20	146.20	1.54	2.07	100.0
NNO2FR	NITRITE,FILT. REACT.	mg/L	0	0.11	0.18	3	3	100.0	42	36	85.7	0.13	0.05	1.28	3.13	100.0
NNOTFR	NITRATES,TOTAL FILT.REAC.	mg/L	0	0.70	1.30	3	3	100.0	44	39	88.6	1.04	0.41	1.41	2.66	100.0
NNTKUR	NITROGEN-TOT-KJEL.,UNF.TOT	mg/L	0	338.00	725.00	3	3	100.0	42	42	100.0	553.77	324.28	1.53	1.95	100.0
PH	(-LOG(H+(CONCN))		0	7.03	7.76	3	3	100.0	44	44	100.0	7.29	6.94	1.06	1.05	100.0
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/L	0	16.50	53.50	3	3	100.0	43	43	100.0	34.96	53.83	1.94	4.47	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0	434.00	542.00	3	3	100.0	42	42	100.0	482.24	2242.77	1.13	3.60	100.0
RSPLOI	RESIDUE,PART.LOSS ON IGNI.	mg/L	0	314.00	355.00	3	3	100.0	13	13	100.0	335.57	1312.86	1.06	2.47	100.0
PHNOL	PHENOLICS (4AAP)	mg/L	0	4.60	9.10	3	2	66.7	44	11	25.0	2.19	0.41	6.75	3.16	55.6
METALS																
AGUT	SILVER,UNFILT.TOTAL	ug/L	0	30.00	60.00	4	4	100.0	53	42	79.3	40.00	72.30	1.43	4.09	100.0
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	3500.00	8000.00	4	4	100.0	53	53	100.0	4930.00	28798.20	1.48	4.42	100.0
CAUT	CALCIUM,UNFILT.TOTAL	ug/L	0	87000.00	180000.00	4	4	100.0	54	54	100.0	141630.00	208447.60	1.40	1.87	100.0
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	80.00	130.00	4	4	100.0	53	51	96.2	110.00	874.70	1.26	6.11	100.0
CUUT	COPPER,UNFILT.TOTAL	ug/L	0	330.00	330.00	1	1	100.0	12	12	100.0	330.00	1814.00	0.00	5.64	100.0
FEUT	IRON,UNFILT.TOTAL	ug/L	0	16000.00	24000.00	4	4	100.0	53	53	100.0	18480.00	109943.30	1.21	4.19	100.0
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	0.41	0.53	3	3	100.0	47	44	93.6	0.45	1.68	1.15	4.49	100.0
MGUT	MAGNESIUM,UNFILT.TOTAL	ug/L	0	21000.00	35000.00	4	4	100.0	54	54	100.0	27850.00	41620.20	1.22	1.78	100.0
NIUT	NICKEL,UNFILT.TOTAL	ug/L	0	50.00	90.00	4	4	100.0	53	41	77.4	70.00	308.60	1.29	3.08	88.9
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	810.00	1200.00	4	4	100.0	53	53	100.0	1040.00	1347.00	1.21	2.13	100.0
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	250.00	320.00	4	4	100.0	53	53	100.0	280.00	3112.40	1.12	7.41	100.0
COUT	COBALT,UNFILT.TOTAL	ug/L	0	10.00	30.00	4	2	50.0	53	21	39.6	10.00	23.60	2.33	4.63	88.9
CDUT	CADMIUM,UNFILT.TOTAL	ug/L	0	10.00	10.00	4	1	25.0	53	37	69.8	10.00	58.40	1.48	6.63	77.8
MOUT	MOLYBDENUM,UNFILT.TOTAL	ug/L	0	20.00	20.00	4	1	25.0	54	18	33.3	10.00	35.60	1.41	4.15	77.8
PBUT	LEAD,UNFILT.TOTAL	ug/L	0	150.00	150.00	4	1	25.0	55	36	67.9	70.00	429.50	1.73	6.62	100.0
PESTICIDES,HERBICIDES,PCBS																
P1PCBT	PCB, TOTAL	ug/L	2	1.30	2.90	3	2	66.7	44	27	61.4	1.15	0.77	2.71	7.58	77.8
P1DIEL	DIELDRIN	ug/L	2	0.26	0.26	3	1	33.3	44	7	15.9	0.14	0.06	1.74	2.81	55.6
P1ENDI	ENDOSULFAN I	ug/L	3	0.20	0.20	3	1	33.3	44	3	6.8	0.13	0.06	1.49	3.33	33.3
P1PDD	PP-DDD	ug/L	1	0.43	0.43	3	1	33.3	44	10	22.7	0.16	0.05	2.32	2.86	66.7

PLANT NAME : Ottawa (Green Creek)
PLANT TYPE : Primary

SAMPLING TYPE : Raw Sludge
SAMPLE FORM : Dry Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS (DRY WEIGHT)	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
NH4TPR	AMMONIUM,TOTAL PILT.REAC.	mg/kg	0	3126.67	3126.67	1	1	100.0	48	47	97.9	3126.67	5911.32	0.00	4.59	100.0
NNOTPR	NITRATES,TOTAL FILT.REAC.	mg/kg	0	28.33	28.33	1	1	100.0	48	43	89.6	28.33	25.44	0.00	2.21	93.9
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/kg	0	30833.33	30833.33	1	1	100.0	51	51	100.0	30833.33	36897.85	0.00	2.98	100.0
PH	(-LOG(H+(CONCN))	mg/kg	0	4.73	4.73	1	1	100.0	49	49	100.0	4.73	6.03	0.00	1.10	100.0
PHNOL	PHENOLICS (4AAP)	mg/kg	0	400.00	400.00	1	1	100.0	50	41	82.0	400.00	82.34	0.00	3.54	85.3
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/kg	0	8433.33	8433.33	1	1	100.0	42	42	100.0	8433.33	20347.70	0.00	4.43	100.0
RST	RESIDUE, TOTAL	mg/kg	0	30000.00	30000.00	1	1	100.0	51	51	100.0	30000.00	32783.51	0.00	1.81	100.0
RSTLOI	RESIDUE,TOT.LOSS ON IGNI	mg/kg	0	22200.00	22200.00	1	1	100.0	51	51	100.0	22200.00	20803.05	0.00	1.77	100.0
METALS																
AGUT	SILVER,UNFILT.TOTAL	mg/kg	0	43.33	43.33	1	1	100.0	45	40	88.9	43.33	30.17	0.00	2.61	84.4
ALUT	ALUMINUM,UNFILT.TOTAL	mg/kg	0	3333.33	3333.33	1	1	100.0	51	51	100.0	3333.33	9835.74	0.00	2.51	100.0
CDUT	CADMIUM,UNFILT.TOTAL	mg/kg	0	5.33	5.33	1	1	100.0	43	40	93.0	5.33	9.74	0.00	4.35	90.0
CRUT	CHROMIUM,UNFILT.TOTAL	mg/kg	0	126.67	126.67	1	1	100.0	51	50	98.0	126.67	301.43	0.00	3.68	97.1
CUUT	COPPER,UNFILT.TOTAL	mg/kg	0	296.67	296.67	1	1	100.0	46	46	100.0	296.67	606.31	0.00	1.72	100.0
HGUT	MERCURY,UNFILT.TOTAL	mg/kg	0	2.67	2.67	1	1	100.0	50	50	100.0	2.67	2.23	0.00	1.67	100.0
NIUT	NICKEL,UNFILT.TOTAL	mg/kg	0	14.67	14.67	1	1	100.0	46	44	95.7	14.67	59.17	0.00	2.90	93.3
PBUT	LEAD,UNFILT.TOTAL	mg/kg	0	90.00	90.00	1	1	100.0	49	48	98.0	90.00	173.99	0.00	2.24	96.9
SRUT	STRONTIUM,UNFILT.TOTAL	mg/kg	0	123.33	123.33	1	1	100.0	51	51	100.0	123.33	231.70	0.00	1.97	100.0
ZNUT	ZINC,UNFILT.TOTAL	mg/kg	0	316.67	316.67	1	1	100.0	51	51	100.0	316.67	905.39	0.00	2.39	100.0
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PMMCRE	M-CRESOL	ug/kg	1	400000.00	400000.00	1	1	100.0	51	42	82.3	400000.00	116847.30	0.00	12.16	85.3
PESTICIDES,HERBICIDES,PCBS																
PTPCBT	PCB, TOTAL	ug/kg	2	66.70	66.70	1	1	100.0	51	40	78.4	66.70	88.70	0.00	3.18	79.4

PLANT NAME : Ottawa (Green Creek) **SAMPLING TYPE : Treated Sludge**
PLANT TYPE : Primary **SAMPLE FORM : Dry Weight**

CONTAM-INANT	CONTAMINANT NAME	UNITS (DRY WEIGHT)	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
NNHTPR	AMMONIUM,TOTAL FIL.T.REAC.	mg/kg	0	269683.26	269683.26	1	1	100.0	25	25	100.0	269683.26	17658.28	0.00	2.92	100.0
NNOTPR	NITRATES,TOTAL FIL.T.REAC.	mg/kg	0	565.61	565.61	1	1	100.0	26	23	88.5	565.61	42.68	0.00	2.29	95.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/kg	0	294117.65	294117.65	1	1	100.0	49	49	100.0	294117.65	38494.12	0.00	1.77	100.0
PH	(-LOG(H+(CONCN))	mg/kg	0	7.30	7.30	1	1	100.0	47	47	100.0	7.30	7.17	0.00	1.09	100.0
PPUT	PHOSPHORUS,UNFIL.T.TOTAL	mg/kg	0	21493.21	21493.21	1	1	100.0	43	43	100.0	21493.21	76638.67	0.00	6.91	100.0
RST	RESIDUE, TOTAL	mg/kg	0	2210.00	2210.00	1	1	100.0	50	50	100.0	2210.00	80434.04	0.00	3.23	100.0
RSTLOI	RESIDUE,TOT.LOSS ON IGNI.	mg/kg	0	1180.00	1180.00	1	1	100.0	50	50	100.0	1180.00	43379.33	0.00	3.19	100.0
METALS																
AGUT	SILVER,UNFIL.T.TOTAL	mg/kg	0	27.15	27.15	1	1	100.0	44	44	100.0	27.15	37.78	0.00	2.33	100.0
AIUT	ALUMINUM,UNFIL.T.TOTAL	mg/kg	0	995.48	995.48	1	1	100.0	50	50	100.0	995.48	10715.94	0.00	2.82	100.0
CRUT	CHROMIUM,UNFIL.T.TOTAL	mg/kg	0	63.35	63.35	1	1	100.0	50	50	100.0	63.35	333.06	0.00	3.59	100.0
CUUT	COPPER,UNFIL.T.TOTAL	mg/kg	0	122.17	122.17	1	1	100.0	45	45	100.0	122.17	732.24	0.00	2.16	100.0
SRUT	STRONTIUM,UNFIL.T.TOTAL	mg/kg	0	447.96	447.96	1	1	100.0	50	50	100.0	447.96	240.93	0.00	2.54	100.0
ZNUT	ZINC,UNFIL.T.TOTAL	mg/kg	0	294.12	294.12	1	1	100.0	50	50	100.0	294.12	988.90	0.00	2.57	100.0
PESTICIDES,HERBICIDES,PCBS																
PHPCBT	PCB, TOTAL	ug/kg	2	452.50	452.50	1	1	100.0	50	32	64.0	452.50	114.10	0.00	4.58	67.7

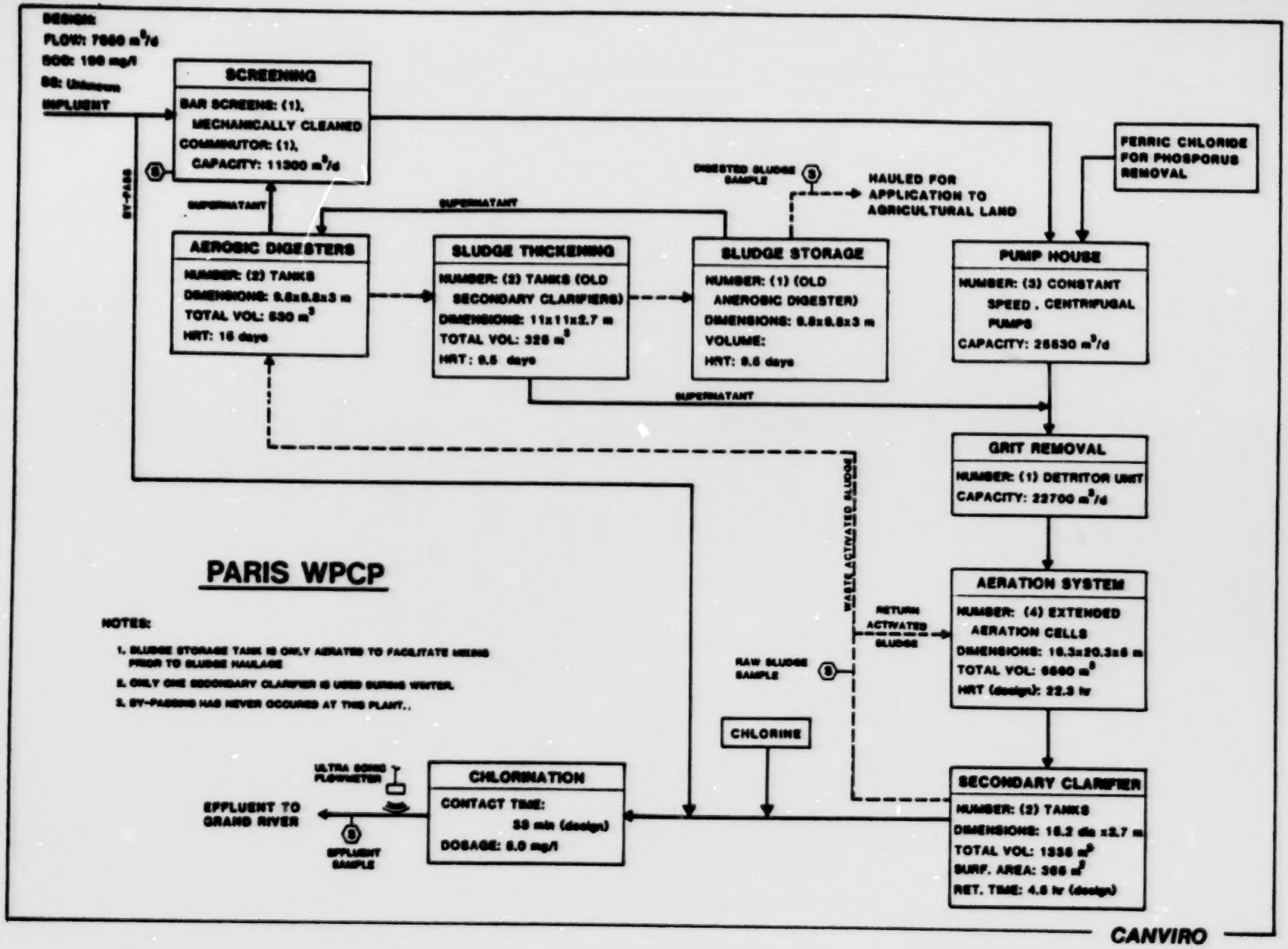
Sub-Appendix A-21

Paris WPCP

Contents:

- Plant Schematic with Design Characteristics
- Annual Data Review (1981 - 1986 Plant Performance)
- Sources of Municipal Water Pollution Control Plant Raw Sewage
- Operational Evaluation for Paris WPCP
- Analytical Data

(KIR18/28A)


DESIGN:
FLOW: 7950 m³/d
BOD: 190 mg/l
SS: Unknown
INFLUENT
SCREENING
BAR SCREENS: (1), MECHANICALLY CLEANED
COMMINUTOR: (1), CAPACITY: 11300 m³/d
BY-PASS
SUPERNATANT
AEROBIC DIGESTERS
NUMBER: (2) TANKS
DIMENSIONS: 9.8x9.8x3 m
TOTAL VOL: 550 m³
HRT: 16 days
SLUDGE THICKENING
NUMBER: (2) TANKS (OLD SECONDARY CLARIFIERS)
DIMENSIONS: 11x11x2.7 m
TOTAL VOL: 328 m³
HRT: 9.5 days
SLUDGE STORAGE
NUMBER: (1) (OLD ANEROBIC DIGESTER)
DIMENSIONS: 9.8x9.8x3 m
VOLUME:
HRT: 9.6 days
DIGESTED SLUDGE SAMPLE
HAULED FOR APPLICATION TO AGRICULTURAL LAND
FERRIC CHLORIDE FOR PHOSPORUS REMOVAL
PUMP HOUSE
NUMBER: (3) CONSTANT SPEED, CENTRIFUGAL PUMPS
CAPACITY: 26530 m³/d
GRIT REMOVAL
NUMBER: (1) DETRITOR UNIT
CAPACITY: 22700 m³/d
FROM SECONDARY
AERATION SYSTEM
NUMBER: (4) EXTENDED AERATION CELLS
DIMENSIONS: 18.3x20.3x6 m
TOTAL VOL: 6660 m³
HRT (design): 22.3 hr
RETURN ACTIVATED SLUDGE
RAW SLUDGE SAMPLE
CHLORINE
SECONDARY CLARIFIER
NUMBER: (2) TANKS
DIMENSIONS: 16.2 dia x2.7 m
TOTAL VOL: 1335 m³
SURF. AREA: 366 m²
RET. TIME: 4.6 hr (design)
CHLORINATION
CONTACT TIME: 39 min (design)
DOSAGE: 8.0 mg/l
ULTRA SONIC FLOWMETER
EFFLUENT TO GRAND RIVER
EFFLUENT SAMPLE
PARIS WPCP
NOTES:
1. SLUDGE STORAGE TANK IS ONLY AERATED TO FACILITATE MIXING PRIOR TO SLUDGE HAULAGE
2. ONLY ONE SECONDARY CLARIFIER IS USED DURING WINTER.
3. BY-PASSING HAS NEVER OCCURED AT THIS PLANT..
CANVIRO

PARIS WPCP
Extended Aeration
Phosphorus Removal - Continuous
Capacity - 7.046 10(3)m3/day

PARAMETER	1981	1982	1983	1984	1985	MEAN ANNUAL AVERAGE
Avg. Daily Flow (1000 m3/day)	2.10	2.57	1.92	2.24	2.53	2.27
BOD5 - Influent (mg/L)	173.55	188.43	369.92	288.50	343.00	282.35
BOD5 - Effluent (mg/L)	10.09	22.64	6.01	8.67	6.10	11.25
Annual BOD5 Significantly Different from Mean Annual Average BOD5?	Y	Y	N	N	N	
TSS - Influent (mg/L)	121.47	160.93	243.65	203.00	222.33	192.96
TSS - Effluent (mg/L)	27.53	20.43	9.10	9.47	6.73	14.35
Annual TSS Significantly Different from Mean Annual Average TSS?	Y	N	N	N	Y	
Total P - Influent (mg/L)	5.47	8.00	9.00	7.13	8.44	7.53
Total P - Effluent (mg/L)	1.06	0.00	0.90	0.50	0.55	0.95
Annual TP Significantly Different from Mean Annual Average TP?	Y	I.D.	N	Y	Y	
TP in Compliance?	N	I.D.	Y	Y	Y	Y

I.D. - Insufficient Data

R

SOURCES OF MUNICIPAL WATER POLLUTION CONTROL PLANT RAW SEWAGE

GENERAL DESCRIPTION OF WATER POLLUTION CONTROL PLANT (WPCP)

NAME OF WPCP	PARIS WPCP
WORKS NUMBER	110001097
TREATMENT TYPE	EXTENDED AERATION PHOSPHORUS REMOVAL CONTINUOUS
DESIGN CAPACITY (1000 m3/d)	7.046
1986 AVERAGE DAY FLOW (1000 m3/d)	2.603
POPULATION SERVED	4359

% OF TOTAL FLOW ATTRIBUTED TO:

INDUSTRIAL SOURCES (%)	32
COMMERCIAL SOURCES (%) (Population x 0.0757)	13
RESIDENTIAL SOURCES (%) (Population x 0.175)	29
UNACCOUNTED FOR, INCL. INFILTRATION (100-% Contributed from industrial, commercial and residential sources)	26

PROFILE OF INDUSTRIES IN CATCHMENT

TOTAL NO OF INDUSTRIES	29
INDUSTRIES WITH WATER	11
NO OF SIC CATEGORIES	15

DESCRIPTION OF THE TOP 5 INDUSTRIES DISCHARGED TO THE WPCP (BASED ON WATER USE DATA)

DESCRIPTION	SIC	# OF COMPANIES
POULTRY	2016-2017	1
MACHINERY MFG	3500-3599	3
PRIMARY TEXTILES	2211-2269	1
MEAT	2011-2013	2
METAL FINISHING	3411-3469	1

R

OPERATIONAL EVALUATION FOR: P A R I S W P C P

TREATMENT FACILITY: Secondary
PERIOD ENDING: May 17,1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 7,050 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
RAW SEWAGE FLOW	2,680	2,920	2,900	2,820	2,550	2,550	2,550
% of Design Flow	38.01%	41.42%	41.13%	40.02%	36.17%	36.17%	36.17%
Influent BOD (mg/L)		200			370		
Primary BOD (mg/L)							
Secondary BOD (mg/L)		2			4		
% PRIMARY REMOVAL							
% SECONDARY REMOVAL		99.3			98.9		
Influent SS (mg/L)		116			196		
Primary SS (mg/L)							
Secondary SS (mg/L)		6			4		
% PRIMARY REMOVAL							
% SECONDARY REMOVAL		95.1			98.0		
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)		0.1			0.1		
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)		48.0			67.2		
Primary TKN (mg/L)							
Secondary TKN (mg/L)		1.2			0.9		
% PRIMARY REMOVAL							
% SECONDARY REMOVAL		97.5			98.7		
Influent Total P (mg/L)		8.9			8.0		
Primary Total P (mg/L)							
Secondary Total P (mg/L)		0.32			0.35		
% PRIMARY REMOVAL		100.0			100.0		
% SECONDARY REMOVAL		98.4			95.6		

OPERATIONAL EVALUATION FOR: P A R I S W P C P

TREATMENT FACILITY: Secondary
PERIOD ENDING: May 17,1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 7,050 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 8	DAY 9	DAY 10	DAY 11	DAY 12	DAY 13	DAY 14
RAW SEWAGE FLOW	4,410	2,320	2,470	2,090	2,230	2,230	2,230
% of Design Flow	62.55%	32.91%	35.04%	29.65%	31.63%	31.63%	31.63%
Influent BOD (mg/L)							
Primary BOD (mg/L)							
Secondary BOD (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent SS (mg/L)							
Primary SS (mg/L)							
Secondary SS (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)							
Primary Total P (mg/L)							
Secondary Total P (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							

OPERATIONAL EVALUATION FOR: P A R I S W P C P

TREATMENT FACILITY: Secondary
PERIOD ENDING: May 17,1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 7,050 m3/d

PARAMETER	SAMPLING PERIOD DAY 15	DAY 16	DAY 17	DAY 18	DAY 19	DAY 20	DAY 21
RAW SEWAGE FLOW	2,730	2,700	2,550	2,930	3,290	2,000	2,000
% of Design Flow	38.72%	38.30%	36.17%	41.56%	46.67%	28.37%	28.37%
Influent BOD (mg/L)			248				
Primary BOD (mg/L)							
Secondary BOD (mg/L)			4				
% PRIMARY REMOVAL							
% SECONDARY REMOVAL			98.3				
Influent SS (mg/L)			102				
Primary SS (mg/L)							
Secondary SS (mg/L)			5				
% PRIMARY REMOVAL							
% SECONDARY REMOVAL			94.9				
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)			0.1				
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)			52.7				
Primary TKN (mg/L)							
Secondary TKN (mg/L)			0.4				
% PRIMARY REMOVAL							
% SECONDARY REMOVAL			99.2				
Influent Total P (mg/L)			6.3				
Primary Total P (mg/L)							
Secondary Total P (mg/L)			0.97				
% PRIMARY REMOVAL							
% SECONDARY REMOVAL			84.5				

PLANT NAME : Paris
PLANT TYPE : Secondary

SAMPLING TYPE : Raw Sewage
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	PLANT MIN. CONC. > MDL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0	279.00	330.00	4	4	100.0	267	266	99.6	318.55	140.23	1.12	1.93	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0	384.00	476.00	5	5	100.0	260	258	99.2	430.91	287.75	1.08	1.82	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0	25.50	34.00	4	4	100.0	271	271	100.0	28.84	22.39	1.13	1.81	100.0
NNHTPR	AMMONIUM,TOTAL FILT.REAC.	mg/L	0	33.20	43.10	5	5	100.0	275	274	99.6	38.34	15.37	1.11	1.69	100.0
NNO2PR	NITRITE,FILT. REACT.	mg/L	0	0.01	0.03	4	4	100.0	271	58	21.4	0.02	0.01	2.24	2.98	51.4
NNOTPR	NITRATES,TOTAL FILT.REAC.	mg/L	0	0.15	0.25	5	5	100.0	275	28	10.2	0.18	0.05	1.26	2.33	32.4
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0	51.20	61.50	5	5	100.0	273	273	100.0	56.93	25.44	1.08	1.47	100.0
PH	(-LOG(H+(CONCN))		0	6.92	7.25	5	5	100.0	275	275	100.0	7.09	6.90	1.02	1.05	100.0
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/L	0	7.23	10.00	5	5	100.0	248	248	100.0	8.74	5.18	1.13	1.51	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0	109.00	161.00	3	3	100.0	267	266	99.6	126.37	126.88	1.24	1.93	100.0
METALS																
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	240.00	1700.00	6	6	100.0	322	306	95.0	420.00	1000.10	2.03	2.65	97.3
CUUT	COPPER,UNFILT.TOTAL	ug/L	0	60.00	60.00	1	1	100.0	49	48	98.0	60.00	110.60	0.00	2.28	97.1
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	0.25	0.38	5	5	100.0	283	274	96.8	0.30	0.23	1.22	2.11	100.0
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	400.00	450.00	6	6	100.0	319	318	99.7	420.00	370.70	1.06	2.14	100.0
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	100.00	240.00	6	6	100.0	322	315	97.8	120.00	211.00	1.40	2.94	100.0
COUT	COBALT,UNFILT.TOTAL	ug/L	0	10.00	70.00	6	4	66.7	322	82	25.5	10.00	9.30	3.14	2.31	83.8
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	20.00	30.00	6	3	50.0	322	237	73.6	20.00	51.10	1.61	3.44	89.2
CDUT	CADMIUM,UNFILT.TOTAL	ug/L	0	10.00	10.00	6	2	33.3	322	76	23.6	10.00	6.50	1.61	2.09	70.3
MOUT	MOLYBDENUM,UNFILT.TOTAL	ug/L	0	20.00	30.00	6	2	33.3	321	41	12.8	10.00	12.40	1.62	1.72	56.8
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PMPHEN	PHENOL	ug/L	2	26.40	74.50	5	5	100.0	275	118	42.9	37.70	14.52	1.52	2.46	78.4
PMMCRE	M-CRESOL	ug/L	1	24.80	45.30	5	4	80.0	275	167	60.7	25.17	25.59	2.06	3.45	86.5
PESTICIDES,HERBICIDES,PCBS																
P24D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	0.05	0.63	5	5	100.0	276	214	77.5	0.16	0.13	3.15	3.72	100.0
P1BHCG	GAMMA-BHC(HEXACHLORCYCLOHEXANE)	ug/L	2	0.03	0.03	5	1	20.0	276	143	51.8	0.01	0.02	1.63	2.29	94.6
P245T	2,4,5-TRICLORPHENOXYACETIC ACID	ug/L	3	0.10	0.10	5	1	20.0	276	22	8.0	0.06	0.06	1.36	1.60	37.8
VOLATILES ORGANIC COMPOUNDS																
X1CDBM	CHLORODIBROMOMETHANE	ug/L	1	56.00	56.00	5	1	20.0	274	2	0.7	26.57	20.16	1.58	1.10	5.4

PLANT NAME : Paris
PLANT TYPE : Secondary

SAMPLING TYPE : Final Effluent
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	STD. FOR SURFACE WATER	STD. REF.	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET.	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																		
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0		-	17.00	34.00	4	4	100.0	213	211	99.1	23.86	21.22	1.48	2.07	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0		-	16.00	46.00	4	4	100.0	213	211	99.1	27.35	52.80	1.66	1.85	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0		-	4.50	5.50	4	4	100.0	220	220	100.0	5.11	8.09	1.10	1.60	100.0
NH3TFR	AMMONIUM,TOTAL FILT.REAC.	mg/L	0		-	0.05	0.10	5	5	100.0	223	204	91.5	0.06	3.90	1.36	6.98	100.0
NO2FR	NITRITE,FILT. REACT.	mg/L	0		-	0.10	0.67	4	4	100.0	220	194	88.2	0.23	0.22	2.04	5.95	96.4
NO3TFR	NITRATES,TOTAL FILT.REAC.	mg/L	0		-	23.60	28.40	5	5	100.0	224	186	83.0	26.21	2.33	1.07	7.75	96.4
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0		-	0.90	1.30	5	5	100.0	222	222	100.0	1.15	7.97	1.17	2.71	100.0
PH	(-LOG(H+(CONCN))		0		-	7.28	7.84	5	5	100.0	224	224	100.0	7.52	7.10	1.03	1.05	100.0
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/L	0		-	0.68	1.22	5	5	100.0	211	206	97.6	0.95	0.68	1.24	1.97	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0		-	3.50	5.00	4	3	75.0	220	219	99.6	2.94	10.12	1.91	2.00	100.0
METALS																		
CUUT	COPPER,UNFILT.TOTAL	ug/L	0	5.00	ONT-MOE	10.00	10.00	1	1	100.0	47	30	63.8	10.00	13.10	0.00	2.56	77.8
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	0.20	ONT-MOE	0.01	0.02	5	5	100.0	233	220	94.4	0.01	0.03	1.46	2.62	100.0
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	3750.00	ONT-MOE	300.00	350.00	6	6	100.0	267	267	100.0	330.00	340.90	1.06	2.14	100.0
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	30.00	ONT-MOE	10.00	30.00	6	5	83.3	267	262	98.1	10.00	53.30	1.92	2.48	100.0
MOUT	MOLYBDENUM,UNFILT.TOTAL	ug/L	0		-	10.00	10.00	6	3	50.0	267	75	28.1	10.00	6.60	1.46	1.56	67.9
COUT	COBALT,UNFILT.TOTAL	ug/L	0	5.00	NYS-STD	10.00	20.00	6	2	33.3	266	65	24.4	10.00	6.40	1.79	1.54	82.1
AGUT	SILVER,UNFILT.TOTAL	ug/L	0	0.10	ONT-MOE	10.00	10.00	6	1	16.7	267	15	5.6	10.00	6.90	1.33	1.84	32.1
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	100.00	ONT-MOE	10.00	10.00	6	1	16.7	267	137	51.3	10.00	9.00	1.33	2.00	89.3
PESTICIDES,HERBICIDES,PCBS																		
P24D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	4.00	ONT-MOE	0.14	13.00	5	5	100.0	227	177	78.0	1.58	0.08	5.47	4.71	100.0
P1BHCG	GAMMA-BHC(HEXCHLORCYCLHEXANE)	ug/L	2	0.06	ONT-MOE	0.01	0.02	5	4	80.0	227	157	69.2	0.01	0.02	1.86	2.48	96.4
P245T	2,4,5-TRICLORPHENOXYACETIC ACID	ug/L	3		-	0.07	1.10	5	4	80.0	227	25	11.0	0.15	0.03	4.12	2.27	42.9
P3SILV	SILVEX	ug/L	3		-	0.10	0.93	5	2	40.0	227	23	10.1	0.07	0.03	4.86	1.83	50.0
VOLATILES ORGANIC COMPOUNDS																		
X1CHLO	CHLOROFORM	ug/L	1	0.20	NYS-STD	4.20	4.20	5	1	20.0	224	37	16.5	1.33	1.37	1.90	2.18	64.3

PLANT NAME : Paris
PLANT TYPE : Secondary

SAMPLING TYPE : Raw Sludge
SAMPLE FORM : Dry Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS (DRY WEIGHT)	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
COD	CHEMICAL OXYGEN DEMAND	mg/kg	0	1136968.09	1136968.09	1	1	100.0	45	45	100.0	1136968.09	892221.45	0.00	3.1*	100.0
NNHTPR	AMMONIUM,TOTAL PR.T.REAC.	mg/kg	0	2194.15	2194.15	1	1	100.0	48	47	97.9	2194.15	5911.32	0.00	4.59	100.0
NNOTPR	NITRATES,TOTAL PR.T.REAC.	mg/kg	0	33.24	33.24	1	1	100.0	48	43	89.6	33.24	25.44	0.00	2.21	93.9
NNTKUR	NITROGEN-TOT-KJEL,UNP.TOT	mg/kg	0	66489.36	66489.36	1	1	100.0	51	51	100.0	66489.36	36897.85	0.00	2.98	100.0
PH	(-LOG(H+(CONCN))	mg/kg	0	7.19	7.19	1	1	100.0	49	49	100.0	7.19	6.03	0.00	1.10	100.0
PHNOL	PHENOLICS (4AAP)	mg/kg	0	585.11	585.11	1	1	100.0	50	41	82.0	585.11	82.34	0.00	3.54	85.3
PPUT	PHOSPHORUS,UNPR.T.TOTAL	mg/kg	0	33776.60	33776.60	1	1	100.0	42	42	100.0	33776.60	20347.70	0.00	4.43	100.0
RST	RESIDUE, TOTAL	mg/kg	0	7520.00	7520.00	1	1	100.0	51	51	100.0	7520.00	32783.51	0.00	1.81	100.0
RSTI.OI	RESIDUE,TOT.LOSS ON IGNI.	mg/kg	0	4650.00	4650.00	1	1	100.0	51	51	100.0	4650.00	20803.05	0.00	1.77	100.0
METALS																
ALUT	ALUMINUM,UNPR.T.TOTAL	mg/kg	0	5186.17	5186.17	1	1	100.0	51	51	100.0	5186.17	9835.74	0.00	2.51	100.0
ASUT	ARSENIC,UNPR.T.TOTAL	mg/kg	0	6.65	6.65	1	1	100.0	51	50	98.0	6.65	6.13	0.00	2.01	97.1
CRUT	CHROMIUM,UNPR.T.TOTAL	mg/kg	0	279.26	279.26	1	1	100.0	51	50	98.0	279.26	301.43	0.00	3.68	97.1
CUUT	COPPER,UNPR.T.TOTAL	mg/kg	0	400.27	400.27	1	1	100.0	46	46	100.0	400.27	606.31	0.00	1.72	100.0
HGUT	MERCURY,UNPR.T.TOTAL	mg/kg	0	1.33	1.33	1	1	100.0	50	50	100.0	1.33	2.23	0.00	1.67	100.0
NIUT	NICKEL,UNPR.T.TOTAL	mg/kg	0	35.90	35.90	1	1	100.0	46	44	95.7	35.90	59.17	0.00	2.90	93.3
PBUT	LEAD,UNPR.T.TOTAL	mg/kg	0	74.47	74.47	1	1	100.0	49	48	98.0	74.47	173.99	0.00	2.24	96.9
SRUT	STRONTIUM,UNPR.T.TOTAL	mg/kg	0	292.55	292.55	1	1	100.0	51	51	100.0	292.55	231.70	0.00	1.97	100.0
ZNUT	ZINC,UNPR.T.TOTAL	mg/kg	0	505.32	505.32	1	1	100.0	51	51	100.0	505.32	905.39	0.00	2.39	100.0
	PESTICIDES,HERBICIDES,PCBS															
P24D	2,4-DICHLOROPHENOXYACETIC ACID	ug/kg	3	126.30	126.30	1	1	100.0	51	38	74.5	126.30	93.20	0.00	6.50	82.3

PLANT NAME : Paris **SAMPLING TYPE : Treated Sludge**
PLANT TYPE : Secondary **SAMPLE FORM : Dry Weight**

CONTAM-INANT	CONTAMINANT NAME	UNITSQA/QC (DRY WEIGHT)	CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
COD	CHEMICAL OXYGEN DEMAND	mg/kg	0	1187500.00	1187500.00	1	1	100.0	36	36	100.0	1187500.00	508097.94	0.00	4.65	100.0
NNHTPR	AMMONIUM,TOTAL FIL.T.REAC.	mg/kg	0	3212.50	3212.50	1	1	100.0	25	25	100.0	3212.50	17658.28	0.00	2.92	100.0
NNOTFR	NITRATES,TOTAL FIL.T.REAC.	mg/kg	0	25.00	25.00	1	1	100.0	26	23	88.5	25.00	42.68	0.00	2.29	95.0
NNTKUR	NITROGEN-TOT-KJEL.,UNF.TOT	mg/kg	0	56250.00	56250.00	1	1	100.0	49	49	100.0	56250.00	38494.12	0.00	1.77	100.0
PH	(-LOG(H+(CONCN))	mg/kg	0	7.34	7.34	1	1	100.0	47	47	100.0	7.34	7.17	0.00	1.09	100.0
PHENOL	PHENOLICS (4AAP)	mg/kg	0	1062.50	1062.50	1	1	100.0	49	41	83.7	1062.50	43.05	0.00	3.14	87.9
PPUT	PHOSPHORUS,UNFIL.T.TOTAL	mg/kg	0	33562.50	33562.50	1	1	100.0	43	43	100.0	33562.50	76638.67	0.00	6.91	100.0
RST	RESIDUE, TOTAL	mg/kg	0	16000.00	16000.00	1	1	100.0	50	50	100.0	16000.00	80434.04	0.00	3.23	100.0
RSTLOI	RESIDUE,TOT.LOSS ON IGNI.	mg/kg	0	10200.00	10200.00	1	1	100.0	50	50	100.0	10200.00	43379.33	0.00	3.19	100.0
METALS																
AGUT	SILVER,UNFIL.T.TOTAL	mg/kg	0	62.50	62.50	1	1	100.0	44	44	100.0	62.50	37.78	0.00	2.33	100.0
ALUT	ALUMINUM,UNFIL.T.TOTAL	mg/kg	0	5687.50	5687.50	1	1	100.0	50	50	100.0	5687.50	10715.94	0.00	2.82	100.0
ASUT	ARSENIC,UNFIL.T.TOTAL	mg/kg	0	3.75	3.75	1	1	100.0	50	49	98.0	3.75	5.40	0.00	2.06	97.1
COUT	COBALT,UNFIL.T.TOTAL	mg/kg	0	7.50	7.50	1	1	100.0	39	32	82.1	7.50	9.14	0.00	2.75	85.7
CRUT	CHROMIUM,UNFIL.T.TOTAL	mg/kg	0	268.75	268.75	1	1	100.0	50	50	100.0	268.75	333.06	0.00	3.59	100.0
CUUT	COPPER,UNFIL.T.TOTAL	mg/kg	0	435.00	435.00	1	1	100.0	45	45	100.0	435.00	732.24	0.00	2.16	100.0
HGUT	MERCURY,UNFIL.T.TOTAL	mg/kg	0	1.88	1.88	1	1	100.0	50	49	98.0	1.88	3.24	0.00	2.04	97.1
MOUT	MOLYBDENUM,UNFIL.T.TOTAL	mg/kg	0	10.00	10.00	1	1	100.0	34	23	67.7	10.00	6.41	0.00	2.84	69.2
PBUT	LEAD,UNFIL.T.TOTAL	mg/kg	0	87.50	87.50	1	1	100.0	50	49	98.0	87.50	196.62	0.00	2.46	97.1
SEUT	SELENIUM,UNFIL.T.TOTAL	mg/kg	0	3.13	3.13	1	1	100.0	50	48	96.0	3.13	2.67	0.00	2.98	97.1
SRUT	STRONTIUM,UNFIL.T.TOTAL	mg/kg	0	293.75	293.75	1	1	100.0	50	50	100.0	293.75	260.93	0.00	2.54	100.0
ZNUT	ZINC,UNFIL.T.TOTAL	mg/kg	0	556.25	556.25	1	1	100.0	50	50	100.0	556.25	988.90	0.00	2.57	100.0
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PMMCRE	M-CRESOL	ug/kg	1	225000.00	225000.00	1	1	100.0	50	15	30.0	225000.00	5281.80	0.00	8.20	35.3
DIOXINS AND FURANS																
P98CDD	OCTACHLORODIBENZODIOXIN	ug/kg	1	2.70	2.70	1	1	100.0	49	26	53.1	2.70	7.10	0.00	3.84	64.7
PESTICIDES,HERBICIDES,PCBS																
P324D	2,4-DICHLOROPHENOXYACETIC ACID	ug/kg	3	875.00	875.00	1	1	100.0	50	25	50.0	875.00	75.00	0.00	5.81	64.7

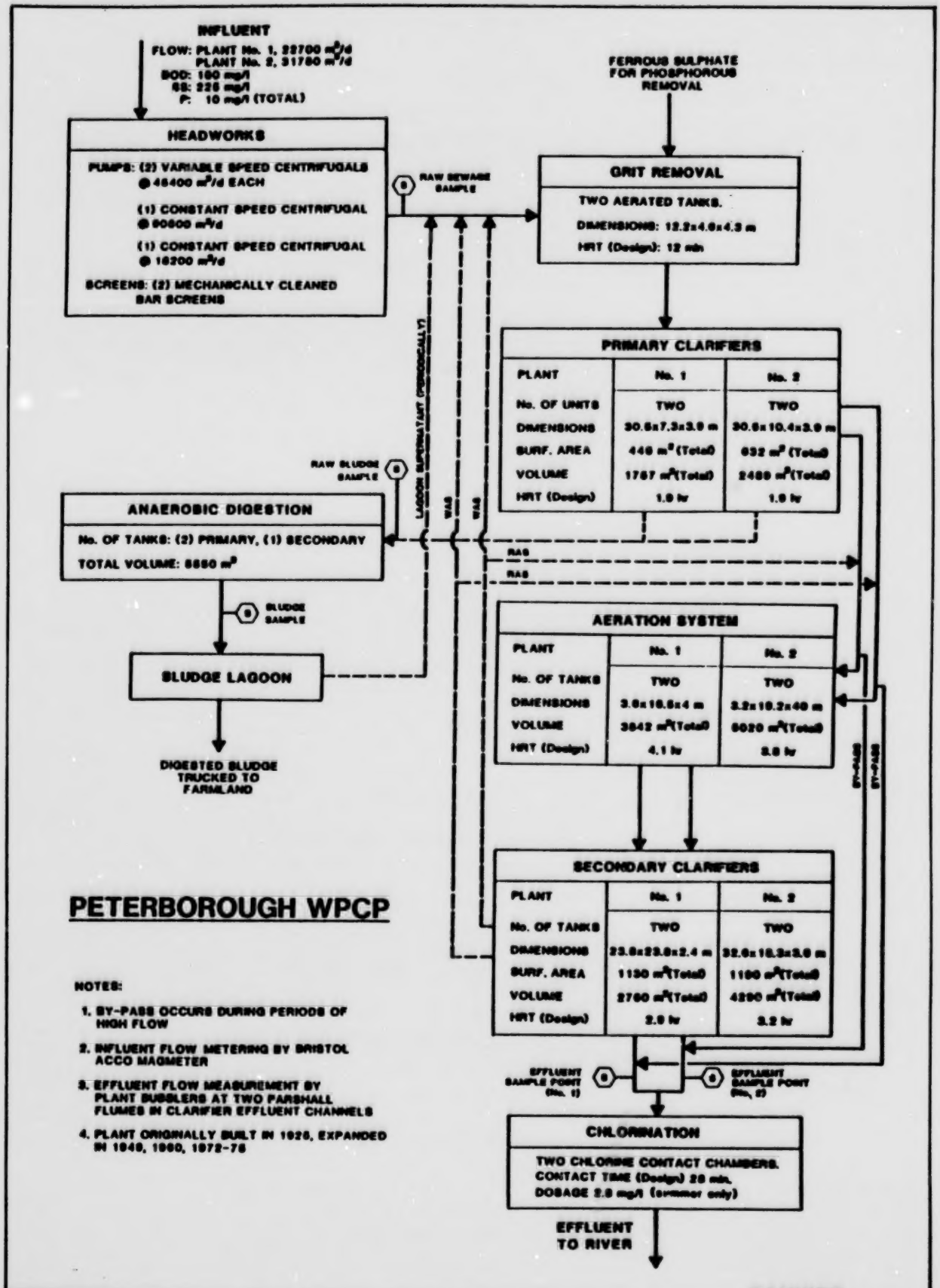
Sub-Appendix A-22

Peterborough WPCP

Contents:

- Plant Schematic with Design Characteristics
- Annual Data Review (1981 - 1986 Plant Performance)
- Sources of Municipal Water Pollution Control Plant Raw Sewage
- Operational Evaluation for Peterborough WPCP
- Analytical Data

(KIR18/28A)



PETERBOROUGH WPCP

NOTES:

1. BY-PASS OCCURS DURING PERIODS OF HIGH FLOW
2. INFLUENT FLOW METERING BY BRISTOL ACCO MAGMETER
3. EFFLUENT FLOW MEASUREMENT BY PLANT BUBBLERS AT TWO PARSHALL FLUMES IN CLARIFIER EFFLUENT CHANNELS
4. PLANT ORIGINALLY BUILT IN 1926, EXPANDED IN 1949, 1960, 1972-76

CANVIRO

PETERBOROUGH WPCP
Conventional Activated Sludge
Phosphorus Removal - Continuous
Capacity - 68.190 10(3)m3/day

PARAMETER	1981	1982	1983	1984	1985	MEAN ANNUAL AVERAGE
Avg. Daily Flow (1000 m3/day)	51.87	54.42	53.14	54.60	56.91	54.14
BOD5 - Influent (mg/L)	65.30	89.00	90.00	68.42	77.46	78.06
BOD5 - Effluent (mg/L)	8.20	11.70	9.20	12.21	11.89	10.62
Annual BOD5 Significantly Different from Mean Annual Average BOD5?	I.D.	I.D.	I.D.	I.D.	I.D.	
TSS - Influent (mg/L)	79.20	84.00	88.00	77.63	71.55	80.37
TSS - Effluent (mg/L)	8.60	10.00	7.00	6.84	7.06	7.75
Annual TSS Significantly Different from Mean Annual Average TSS?	I.D.	I.D.	I.D.	I.D.	I.D.	
Total P - Influent (mg/L)	3.40	36.10	3.42	3.06	3.26	10.20
Total P - Effluent (mg/L)	0.74	0.94	0.77	0.81	0.80	0.81
Annual TP Significantly Different from Mean Annual Average TP?	I.D.	I.D.	I.D.	I.D.	I.D.	
TP in Compliance?	Y	Y	Y	Y	Y	Y

I.D. - Insufficient Data

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SOURCES OF MUNICIPAL WATER POLLUTION CONTROL PLANT RAW SEWAGE

GENERAL DESCRIPTION OF WATER POLLUTION CONTROL PLANT (WPCP)

NAME OF WPCP	PETERBOROUGH WPCP
WORKS NUMBER	120000676
TREATMENT TYPE	CONVENTIONAL ACTIVATED SLUDGE PHOSPHORUS REMOVAL CONTINUOUS,EFFLUENT
DESIGN CAPACITY (1000 m3/d)	68.190
1986 AVERAGE DAY FLOW (1000 m3/d)	53.188
POPULATION SERVED	61063

% OF TOTAL FLOW ATTRIBUTED TO:

INDUSTRIAL SOURCES (%)	22
COMMERCIAL SOURCES (%) (Population x 0.0757)	9
RESIDENTIAL SOURCES (%) (Population x 0.175)	20
UNACCOUNTED FOR, INCL. INFILTRATION (100-% Contributed from industrial, commercial and residential sources)	49

PROFILE OF INDUSTRIES IN CATCHMENT

TOTAL NO OF INDUSTRIES	144
INDUSTRIES WITH WATER	51
NO OF SIC CATEGORIES	28

DESCRIPTION OF THE TOP 5 INDUSTRIES DISCHARGED TO THE WPCP (BASED ON WATER USE DATA)

DESCRIPTION	SIC	# OF COMPANIES
ELECTRICAL,ELECTRONIC CMPTS	3612-3690	6
PLASTICS MOLDING	3070-3079	7
MACHINERY MFG	3500-3599	15
MISC. CONVERTED PAPER PRODUCTS	2640-2655	4
GRAIN MILLS	2041-2048	2

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OPERATIONAL EVALUATION FOR: PETERBOROUGH WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: March 13, 1987
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: Plant#1-22,700 m3/d; Plant#2-31,780 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
RAW SEWAGE FLOW	43,325	45,916	45,960	46,370	46,370	46,961	57,326
% of Design Flow	79.52%	84.28%	84.36%	85.11%	85.11%	86.20%	105.22%
Influent BOD (mg/L)		120.0					
Primary BOD (mg/L)		96.0					
Secondary BOD (mg/L)		14.0					
% PRIMARY REMOVAL		20.0%					
% SECONDARY REMOVAL		88.3%					
Influent SS (mg/L)	138.0	121.0	156.0	116.0	134.0		
Primary SS (mg/L)	68.0	100.0	161.0	75.0	95.0		
Secondary SS (mg/L)	6.0	2.0	10.0	5.0	4.0		
% PRIMARY REMOVAL	50.7%	17.4%	-3.2%	35.3%	29.1%		
% SECONDARY REMOVAL	95.7%	98.3%	93.6%	95.7%	97.0%		
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)	5.00	4.70	4.20	4.70	4.50		
Primary Total P (mg/L)	4.50	4.20	3.80	3.80	4.00		
Secondary Total P (mg/L)	1.30	1.10	0.90	0.80	0.90		
% PRIMARY REMOVAL	10.0%	10.6%	9.5%	19.1%	11.1%		
% SECONDARY REMOVAL	74.0%	76.6%	78.6%	83.0%	80.0%		

OPERATIONAL EVALUATION FOR: P E T E R B O R O U G H W P C P

TREATMENT FACILITY: Secondary
PERIOD ENDING: March 13, 1987
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: Plant#1-22,700 m3/d; Plant#2-31,780 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 8	DAY 9	DAY 10	DAY 11	DAY 12	DAY 13	DAY 14
RAW SEWAGE FLOW	56,190	53,235	50,598	51,871	54,508	68,873	77,920
% of Design Flow	103.14%	97.71%	92.87%	95.21%	100.05%	126.42%	143.02%
Influent BOD (mg/L)		116.0					
Primary BOD (mg/L)		79.0					
Secondary BOD (mg/L)		13.0					
% PRIMARY REMOVAL		31.9%					
% SECONDARY REMOVAL		88.8%					
Influent SS (mg/L)	104.0	107.0	198.0	124.0	156.0		
Primary SS (mg/L)	52.0	82.0	103.0	67.0	56.0		
Secondary SS (mg/L)	5.0	5.0	7.0	4.0	4.0		
% PRIMARY REMOVAL	50.0%	23.4%	48.0%	46.0%	64.1%		
% SECONDARY REMOVAL	95.2%	95.3%	96.5%	96.8%	97.4%		
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)	5.20	3.80	4.00	4.30	4.80		
Primary Total P (mg/L)	4.70	3.50	3.80	4.00	3.20		
Secondary Total P (mg/L)	0.90	1.00	0.90	0.80	0.70		
% PRIMARY REMOVAL	9.6%	7.9%	5.0%	7.0%	33.3%		
% SECONDARY REMOVAL	82.7%	73.7%	77.5%	81.4%	85.4%		

OPERATIONAL EVALUATION FOR: P E T E R B O R O U G H W P C P

TREATMENT FACILITY: Secondary
PERIOD ENDING: March 13, 1987
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: Plant#1-22,700 m3/d; Plant#2-31,780 m3/d

PARAMETER	SAMPLING PERIOD DAY 15	DAY 16	DAY 17	DAY 18	DAY 19	DAY 20	DAY 21
RAW SEWAGE FLOW	74,192	67,009	63,327	62,645	58,599		
% of Design Flow	136.18%	123.00%	116.24%	114.99%	107.56%		
Influent BOD (mg/L)							
Primary BOD (mg/L)							
Secondary BOD (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent SS (mg/L)							
Primary SS (mg/L)							
Secondary SS (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)	4.00	3.50	4.00	3.20	3.30		
Primary Total P (mg/L)	3.50	4.00	3.70	2.20	2.80		
Secondary Total P (mg/L)	1.20	1.00	1.00	1.10	1.50		
% PRIMARY REMOVAL	12.5%	-14.3%	7.5%	31.2%	15.2%		
% SECONDARY REMOVAL	70.0%	71.4%	75.0%	65.6%	54.5%		

OPERATIONAL EVALUATION FOR: PETERBOROUGH WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: April 24, 1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: Plant#1-22,700 m3/d; Plant#2-31,780 m3/d

PARAMETER	PRE-SAMPLING PERIOD						
	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
RAW SEWAGE FLOW	199,289	91,649	88,331	85,057	79,738	74,920	72,783
% of Design Flow	365.80%	168.23%	162.13%	156.13%	146.36%	137.52%	133.60%
Influent BOD (mg/L)		57.0					
Primary BOD (mg/L)		54.0					
Secondary BOD (mg/L)		16.0					
% PRIMARY REMOVAL		5.3%					
% SECONDARY REMOVAL		71.9%					
Influent SS (mg/L)	74.0	71.0	78.0		64.0		
Primary SS (mg/L)	68.0	77.0	70.0		61.0		
Secondary SS (mg/L)	27.0	10.0	15.0		5.0		
% PRIMARY REMOVAL	8.1%	-8.5%	10.3%		4.7%		
% SECONDARY REMOVAL	63.5%	85.9%	80.8%		92.2%		
Influent NH4 (mg/L)							
Primary NH4 (mg/L)		6.0					
Secondary NH4 (mg/L)		7.0					
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)		2.50					
Primary Total P (mg/L)		2.60					
Secondary Total P (mg/L)		0.90					
% PRIMARY REMOVAL		-4.0%					
% SECONDARY REMOVAL		64.0%					

OPERATIONAL EVALUATION FOR: P E T E R B O R O U G H W P C P

TREATMENT FACILITY: Secondary
PERIOD ENDING: April 24, 1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: Plant#1-22,700 m3/d; Plant#2-31,780 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 8	DAY 9	DAY 10	DAY 11	DAY 12	DAY 13	DAY 14
RAW SEWAGE FLOW	74,374	71,055	68,601	64,236	60,645	58,690	56,099
% of Design Flow	136.52%	130.42%	125.92%	117.91%	111.32%	107.73%	102.97%
Influent BOD (mg/L)			86.0				
Primary BOD (mg/L)			51.0				
Secondary BOD (mg/L)			14.0				
% PRIMARY REMOVAL			40.7%				
% SECONDARY REMOVAL			83.7%				
Influent SS (mg/L)	200.0	84.0	94.0	96.0			
Primary SS (mg/L)	64.0	57.0	58.0	52.0			
Secondary SS (mg/L)	9.0	7.0	7.0	7.0			
% PRIMARY REMOVAL	68.0%	32.1%	38.3%	45.8%			
% SECONDARY REMOVAL	95.5%	91.7%	92.6%	92.7%			
Influent NH4 (mg/L)							
Primary NH4 (mg/L)			13.0				
Secondary NH4 (mg/L)			12.0				
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)			3.50				
Primary Total P (mg/L)			3.30				
Secondary Total P (mg/L)			0.90				
% PRIMARY REMOVAL			5.7%				
% SECONDARY REMOVAL			74.3%				

OPERATIONAL EVALUATION FOR: P E T E R B O R O U G H W P C P

TREATMENT FACILITY: Secondary
PERIOD ENDING: April 24, 1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: Plant#1-22,700 m3/d; Plant#2-31,780 m3/d

	SAMPLING PERIOD						
PARAMETER	DAY 15	DAY 16	DAY 17	DAY 18	DAY 19	DAY 20	DAY 21
RAW SEWAGE FLOW	62,554	62,373	60,372	59,736	57,963		
% of Design Flow	114.82%	114.49%	110.81%	109.65%	106.39%		
Influent BOD (mg/L)			98.0				
Primary BOD (mg/L)			64.0				
Secondary BOD (mg/L)			17.0				
% PRIMARY REMOVAL			34.7%				
% SECONDARY REMOVAL			82.7%				
Influent SS (mg/L)		126.0	166.0	104.0	136.0		
Primary SS (mg/L)		55.0	79.0	106.0	63.0		
Secondary SS (mg/L)		10.0	7.0	11.0	10.0		
% PRIMARY REMOVAL		56.3%	52.4%	-1.9%	53.7%		
% SECONDARY REMOVAL		92.1%	95.8%	89.4%	92.6%		
Influent NH4 (mg/L)							
Primary NH4 (mg/L)			11.0				
Secondary NH4 (mg/L)			11.0				
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)			6.00				
Primary Total P (mg/L)			4.00				
Secondary Total P (mg/L)			1.60				
% PRIMARY REMOVAL			33.3%				
% SECONDARY REMOVAL			73.3%				

PLANT NAME : Peterborough
PLANT TYPE : Secondary

SAMPLING TYPE : Raw Sewage
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	PLANT MIN. CONC. > MDL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0	68.80	135.00	7	7	100.0	267	266	99.6	90.32	140.23	1.30	1.93	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0	82.00	214.00	10	10	100.0	260	258	99.2	135.24	287.75	1.36	1.82	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0	1.50	19.50	10	10	100.0	271	271	100.0	7.89	22.39	2.96	1.81	100.0
NNHTPR	AMMONIUM,TOTAL FILT.REAC.	mg/L	0	8.20	11.10	10	10	100.0	275	274	99.6	9.82	15.37	1.10	1.69	100.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0	11.80	19.80	10	10	100.0	273	273	100.0	16.30	25.44	1.16	1.47	100.0
PH	(-LOG(H+(CONCN))		0	7.00	7.39	10	10	100.0	275	275	100.0	7.22	6.90	1.02	1.05	100.0
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/L	0	2.25	3.90	11	11	100.0	248	248	100.0	3.12	5.18	1.17	1.51	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0	48.40	153.00	10	10	100.0	267	266	99.6	73.31	126.88	1.40	1.93	100.0
METALS																
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	270.00	1400.00	11	11	100.0	322	306	95.0	610.00	1000.10	1.48	2.65	97.3
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	30.00	90.00	11	11	100.0	322	237	73.6	60.00	51.10	1.35	3.44	89.2
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	0.07	0.33	10	10	100.0	283	274	96.8	0.14	0.23	1.53	2.11	100.0
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	180.00	220.00	11	11	100.0	319	318	99.7	200.00	370.70	1.07	2.14	100.0
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	110.00	200.00	11	11	100.0	322	315	97.8	150.00	211.00	1.19	2.94	100.0
CDUT	CADMIUM,UNFILT.TOTAL	ug/L	0	10.00	20.00	11	3	27.3	322	76	23.6	10.00	6.50	1.75	2.09	70.3
COUT	COBALT,UNFILT.TOTAL	ug/L	0	60.00	80.00	11	3	27.3	322	82	25.5	10.00	9.30	3.35	2.31	83.8
MOUT	MOLYBDENUM,UNFILT.TOTAL	ug/L	0	30.00	30.00	11	3	27.3	321	41	12.8	10.00	12.40	1.67	1.72	56.8
AGUT	SILVER,UNFILT.TOTAL	ug/L	0	10.00	20.00	11	2	18.2	321	82	25.6	10.00	10.40	2.16	2.55	75.7
NIUT	NICKEL,UNFILT.TOTAL	ug/L	0	30.00	30.00	11	1	9.1	322	103	32.0	30.00	38.80	1.08	2.70	54.1
PBUT	LEAD,UNFILT.TOTAL	ug/L	0	170.00	170.00	11	1	9.1	322	57	17.7	50.00	59.50	1.51	1.86	51.4
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PMBBP	BUTYLBENZYLPHTHALATE	ug/L	1	15.10	15.10	10	1	10.0	275	34	12.4	5.58	5.85	1.42	1.66	37.8
PMPHEN	PHENOL	ug/L	2	22.20	22.20	10	1	10.0	275	118	42.9	8.36	14.52	1.41	2.46	78.4
DIOXINS AND FURANS																
P94CDF	TETRACHLORODIBENZOFURAN	ng/L	2	4.80	4.80	2	1	50.0	54	1	1.9	1.10	0.41	8.08	3.08	2.7
PESTICIDES,HERBICIDES,PCBS																
P324D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	0.05	0.51	10	10	100.0	276	214	77.5	0.16	0.13	2.12	3.72	100.0
P1DMDT	METHOXYCHLOR	ug/L	1	0.10	2.00	10	8	80.0	276	47	17.0	0.40	0.08	4.04	3.14	43.2
P1BHCG	GAMMA-BHC(HEXCHLORCYCLHEXANE)	ug/L	2	0.02	0.05	10	4	40.0	276	143	51.8	0.02	0.02	2.07	2.29	94.6
P1BHCB	BETA-BHC (HEXCHLORCYCLHEXANE)	ug/L	1	0.02	0.07	10	3	30.0	276	32	11.6	0.01	0.01	1.96	1.66	35.1
P1END5	ENDOSULFAN SULPHATE	ug/L	3	0.29	0.99	10	2	20.0	276	13	4.7	0.07	0.04	3.10	1.56	16.2
P1HEPT	HEPTACHLOR	ug/L	3	0.03	0.03	10	1	10.0	276	10	3.6	0.01	0.01	1.42	1.48	18.9
X2134	1,2,4-TRICHLOROBENZENE	ug/L	3	0.02	0.02	10	1	10.0	276	35	12.7	0.01	0.01	1.25	2.48	40.5
VOLATILES ORGANIC COMPOUNDS																
X1TRIC	TRICHLOROETHYLENE	ug/L	1	12.00	12.00	10	1	10.0	274	15	5.5	19.00	22.59	1.18	1.82	16.2

PLANT NAME : Peterborough
PLANT TYPE : Secondary

SAMPLING TYPE : Final Effluent
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	STD. FOR SURFACE WATER	STD. REF.	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET.	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																		
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0		-	15.00	30.40	7	7	100.0	213	211	99.1	23.29	21.22	1.26	2.07	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0		-	7.40	8.60	10	10	100.0	220	220	100.0	8.06	8.09	1.05	1.60	100.0
NNHTPR	AMMONIUM,TOTAL FILT.REAC.	mg/L	0		-	4.85	10.60	10	10	100.0	223	204	91.5	6.98	3.90	1.31	6.98	100.0
NNO2PR	NITRITE,FILT. REACT.	mg/L	0		-	0.09	0.38	10	10	100.0	220	194	88.2	0.25	0.22	1.55	5.95	96.4
NNOTPR	NITRATES,TOTAL FILT.REAC.	mg/L	0		-	0.75	4.30	10	10	100.0	224	186	83.0	2.52	2.33	1.70	7.75	96.4
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0		-	7.70	14.20	10	10	100.0	222	222	100.0	9.84	7.97	1.25	2.71	100.0
PH	(-LOG(H+(CONCN))		0		-	7.14	7.79	10	10	100.0	224	224	100.0	7.47	7.10	1.03	1.05	100.0
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/L	0		-	0.63	1.84	12	12	100.0	211	206	97.6	0.88	0.68	1.39	1.97	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0		-	6.20	9.80	10	10	100.0	220	219	99.6	7.41	10.12	1.16	2.00	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0		-	12.00	38.00	10	9	90.0	213	211	99.1	19.54	52.80	1.86	1.83	100.0
METALS																		
CUUT	COPPER,UNFILT.TOTAL	ug/L	0	5.00	ONT-MOE	20.00	40.00	2	2	100.0	47	30	63.8	30.00	13.10	1.55	2.56	77.8
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	0.39	ONT-MOE	0.01	0.05	10	10	100.0	233	220	94.4	0.02	0.03	1.68	2.62	100.0
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	3750.00	ONT-MOE	130.00	240.00	12	12	100.0	267	267	100.0	170.00	340.90	1.16	2.14	100.0
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	30.00	ONT-MOE	30.00	100.00	12	12	100.0	267	262	98.1	60.00	53.30	1.43	2.48	100.0
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	75.00	ONT-MOE	40.00	100.00	12	9	75.0	264	196	74.2	50.00	101.70	1.68	3.72	96.4
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	100.00	ONT-MOE	10.00	20.00	12	7	58.3	267	137	51.3	10.00	9.00	1.50	2.00	89.3
NIUT	NICKEL,UNFILT.TOTAL	ug/L	0	25.00	ONT-MOE	20.00	40.00	12	7	58.3	267	171	64.0	10.00	22.10	2.39	3.60	85.7
COUT	COBALT,UNFILT.TOTAL	ug/L	0	5.00	NYS-STD	10.00	20.00	12	4	33.3	266	65	24.4	10.00	6.40	1.73	1.54	82.1
CDUT	CADMIUM,UNFILT.TOTAL	ug/L	0	0.20	ONT-MOE	0.00	0.00	12	2	16.7	267	65	24.3	0.00	2.10	1.44	2.07	71.4
MOUT	MOLYBDENUM,UNFILT.TOTAL	ug/L	0		-	10.00	10.00	12	1	8.3	267	75	28.1	10.00	6.60	1.22	1.56	67.9
PESTICIDES,HERBICIDES,PCBS																		
P24D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	4.00	ONT-MOE	0.05	0.19	10	10	100.0	227	177	78.0	0.08	0.08	2.01	4.71	100.0
P1DMDT	METHOXYCHLOR	ug/L	1	0.04	ONT-MOE	0.10	1.30	10	8	80.0	227	31	13.7	0.21	0.04	3.74	2.72	35.7
P1BHCG	GAMMA-BHC(HEXCHLORCYCLHEXANE)	ug/L	2	0.06	ONT-MOE	0.01	0.04	10	7	70.0	227	157	69.2	0.01	0.02	2.25	2.48	96.4
P1TOX	TOXAPHENE	ug/L	0	0.01	ONT-MOE	0.04	0.04	10	2	20.0	227	3	1.3	0.02	0.02	1.34	1.13	7.1
P1BHCB	BETA-BHC (HEXCHLORCYCLHEXANE)	ug/L	1	0.01	ONT-MOE	0.01	0.01	10	1	10.0	227	9	4.0	0.01	0.01	1.25	1.38	21.4
P1CHLA	ALPHA-CHLORDANE	ug/L	1	0.00	NYS-GUL	0.02	0.02	10	1	10.0	227	5	2.2	0.01	0.01	1.55	1.31	14.3
P1CHLG	GAMMA-CHLORDANE	ug/L	1	0.06	ONT-MOE	0.03	0.03	10	1	10.0	227	5	2.2	0.01	0.01	1.76	1.36	14.3
P1ENDS	ENDOSULFAN SULPHATE	ug/L	3		-	0.06	0.06	10	1	10.0	227	3	1.3	0.02	0.02	1.42	1.22	7.1
VOLATILES ORGANIC COMPOUNDS																		
X1TRIC	TRICHLOROETHYLENE	ug/L	1	3.00	NYS-GUL	2.10	14.00	10	8	80.0	224	17	7.6	4.54	1.12	2.60	1.55	21.4
B2BDCL	BROMODICHLOROBENZENE	ug/L	1		-	10.00	10.00	10	2	20.0	224	3	1.3	5.74	4.93	1.34	1.21	7.1
X1CHLO	CHLOROFORM	ug/L	1	0.20	NYS-STD	4.80	4.80	10	1	10.0	224	37	16.5	1.17	1.37	1.64	2.18	64.3

PLANT NAME : Peterborough
PLANT TYPE : Secondary

SAMPLING TYPE : Raw Sludge
SAMPLE FORM : Dry Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS (DRY WEIGHT)	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
COD	CHEMICAL OXYGEN DEMAND	mg/kg	0	788288.29	1466334.16	2	2	100.0	45	45	100.0	1075125.13	892221.45	1.55	3.19	100.0
NNHTPR	AMMONIUM,TOTAL.FIL.T.REAC.	mg/kg	0	14713.22	15292.79	2	2	100.0	48	47	97.9	15000.21	5911.32	1.03	4.59	100.0
NNOTPR	NITRATES,TOTAL.FIL.T.REAC.	mg/kg	0	31.53	42.39	2	2	100.0	48	43	89.6	36.56	25.44	1.23	2.21	93.9
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/kg	0	45045.05	47381.55	2	2	100.0	51	51	100.0	46198.53	36897.85	1.04	2.98	100.0
PH	(-LOG(H+(CONCN))	mg/kg	0	6.05	6.17	2	2	100.0	49	49	100.0	6.10	6.03	1.02	1.10	100.0
PHENOL	PHENOLICS (4AAP)	mg/kg	0	299.25	337.84	2	2	100.0	50	41	82.0	317.96	82.34	1.09	3.54	85.3
PPUT	PHOSPHORUS,UNFIL.T.TOTAL	mg/kg	0	22972.97	23566.08	2	2	100.0	42	42	100.0	23267.64	20347.70	1.02	4.43	100.0
RST	RESIDUE, TOTAL	mg/kg	0	40100.00	44400.00	2	2	100.0	51	51	100.0	42195.26	32783.51	1.07	1.81	100.0
RSTI.01	RESIDUE,TOT.LOSS ON IGNI.	mg/kg	0	24900.00	31300.00	2	2	100.0	51	51	100.0	27917.20	20803.05	1.18	1.77	100.0
METALS																
AGUT	SILVER,UNFIL.T.TOTAL.	mg/kg	0	38.74	58.10	2	2	100.0	45	40	88.9	47.44	30.17	1.33	2.61	84.4
ALUT	ALUMINUM,UNFIL.T.TOTAL.	mg/kg	0	4954.96	6153.12	2	2	100.0	51	51	100.0	5521.63	9835.74	1.17	2.51	100.0
ASUT	ARSENIC,UNFIL.T.TOTAL.	mg/kg	0	3.15	6.48	2	2	100.0	51	50	98.0	4.52	6.13	1.66	2.01	97.1
CDUT	CADMIUM,UNFIL.T.TOTAL.	mg/kg	0	4.74	4.74	1	1	100.0	43	40	93.0	4.74	9.74	0.00	4.35	90.0
COUT	COBALT,UNFIL.T.TOTAL.	mg/kg	0	19.20	19.20	1	1	100.0	41	30	73.2	19.20	9.29	0.00	4.69	73.3
CRUT	CHROMIUM,UNFIL.T.TOTAL.	mg/kg	0	518.02	535.91	2	2	100.0	51	50	98.0	526.89	301.43	1.02	3.68	97.1
CUUT	COPPER,UNFIL.T.TOTAL.	mg/kg	0	725.94	725.94	1	1	100.0	46	46	100.0	725.94	606.31	0.00	1.72	100.0
HGUT	MERCURY,UNFIL.T.TOTAL.	mg/kg	0	1.80	2.49	2	2	100.0	50	50	100.0	2.12	2.23	1.26	1.67	100.0
MOUT	MOLYBDENUM,UNFIL.T.TOTAL.	mg/kg	0	5.49	6.08	2	2	100.0	37	23	62.2	5.78	5.80	1.08	2.88	64.3
NIUT	NICKEL,UNFIL.T.TOTAL.	mg/kg	0	54.05	113.97	2	2	100.0	46	44	95.7	78.49	59.17	1.69	2.90	93.3
PBUT	LEAD,UNFIL.T.TOTAL.	mg/kg	0	130.63	161.35	2	2	100.0	49	48	98.0	145.18	173.99	1.16	2.24	96.9
SEUT	SELENIUM,UNFIL.T.TOTAL.	mg/kg	0	1.80	2.74	2	2	100.0	50	48	96.0	2.22	3.04	1.35	1.93	93.9
SRUT	STRONTIUM,UNFIL.T.TOTAL.	mg/kg	0	121.85	162.09	2	2	100.0	51	51	100.0	140.54	231.70	1.22	1.97	100.0
ZNUT	ZINC,UNFIL.T.TOTAL.	mg/kg	0	518.02	732.42	2	2	100.0	51	51	100.0	615.96	905.39	1.28	2.39	100.0
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PM4CRE	M-CRESOL	ug/kg	1	666666.70	950124.70	2	2	100.0	51	42	82.3	795874.70	116847.30	1.28	12.16	85.3
PMPHEN	PHENOL	ug/kg	2	14189.50	14189.50	2	1	50.0	51	15	29.4	6923.70	7312.80	2.76	3.00	38.2
DIOXINS AND FURANS																
P8CDD	OCTACHLORODIBENZODIOXIN	ug/kg	1	1.30	3.20	2	2	100.0	50	25	50.0	2.00	8.50	1.89	3.60	58.8
PESTICIDES,HERBICIDES,PCBS																
P1BHCB	BETA-BHC (HEXACHLORCYCLHEXANE)	ug/kg	1	13.50	87.30	2	2	100.0	51	18	35.3	34.30	7.40	3.74	3.29	38.2
P1BHCG	GAMMA-BHC(HEXACHLORCYCLHEXANE)	ug/kg	2	9.00	17.50	2	2	100.0	51	28	54.9	12.50	8.90	1.60	2.69	67.7
P1DMDT	METHOXYCHLOR	ug/kg	1	1171.20	2743.10	2	2	100.0	51	19	37.3	1792.40	45.80	1.83	5.15	44.1
P24D	2,4-DICHLOROPHENOXYACETIC ACID	ug/kg	3	38.30	274.30	2	2	100.0	51	38	74.5	102.50	93.20	4.02	6.50	82.3
P1ALDR	ALDRIN	ug/kg	1	7.50	7.50	2	1	50.0	51	6	11.8	4.20	4.60	2.31	2.50	17.7
P1BHCA	ALPHA-BHC(HEXACHLORCYCLHEXANE)	ug/kg	1	37.40	37.40	2	1	50.0	51	12	23.5	9.30	5.50	7.18	2.74	35.3
P1BHCD	DELTA-BHC(HEXACHLORCYCLHEXANE)	ug/kg	1	7.50	7.50	2	1	50.0	51	3	5.9	4.20	4.00	2.31	2.22	8.8
P1ENDS	ENDOSULFAN SULPHATE	ug/kg	3	159.60	159.60	2	1	50.0	51	6	11.8	37.90	18.60	7.64	2.80	17.7
P1HEPE	HEPTACHLOREPOXIDE	ug/kg	2	7.50	7.50	2	1	50.0	51	12	23.5	4.20	5.00	2.31	2.62	32.4
P1HEPT	HEPTACHLOR	ug/kg	3	37.40	37.40	2	1	50.0	51	7	13.7	9.30	4.50	7.18	2.83	20.6

PLANT NAME : Peterborough
PLANT TYPE : Secondary

SAMPLING TYPE : Raw Sludge
SAMPLE FORM : Dry Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS (DRY WEIGHT)	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
P1OCHL	OXYCHLORDANE	ug/kg	2	20.00	20.00	2	1	50.0	51	8	15.7	6.80	4.50	4.62	2.27	20.6
P1PCBT	PCB, TOTAL	ug/kg	2	49.90	49.90	2	1	50.0	51	40	78.4	52.50	88.70	1.07	3.18	79.4
P1PPDD	PP-DDD	ug/kg	1	5.00	5.00	2	1	50.0	51	13	25.5	3.40	5.10	1.73	2.48	35.3
P1PPDE	PP-DDE	ug/kg	1	6.80	6.80	2	1	50.0	51	22	43.1	4.10	7.30	2.03	2.31	52.9
X2HCB	HEXACHLOROBENZENE	ug/kg	2	12.50	12.50	2	1	50.0	51	17	33.3	5.40	5.60	3.31	2.65	38.2
VOLATILES ORGANIC COMPOUNDS																
B2MPXY	M-, AND P-XYLENES	ug/kg	1	2743.10	2743.10	2	1	50.0	51	16	31.4	1111.70	1345.90	3.59	3.86	41.2

PLANT NAME : Peterborough
PLANT TYPE : Secondary

SAMPLING TYPE : Treated Sludge
SAMPLE FORM : Dry Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS (DRY WEIGHT)	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
COD	CHEMICAL OXYGEN DEMAND	mg/kg	0	797653.96	1110687.02	2	2	100.0	36	36	100.0	941245.93	508097.94	1.26	4.65	100.0
NNHTPR	AMMONIUM,TOTAL FIL.T.REAC.	mg/kg	0	31085.04	39694.66	2	2	100.0	25	25	100.0	35127.06	17658.28	1.19	2.92	100.0
NNOTPR	NITRATES,TOTAL FIL.T.REAC.	mg/kg	0	46.92	78.24	2	2	100.0	26	23	88.5	60.59	42.68	1.44	2.29	95.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/kg	0	60117.30	62977.10	2	2	100.0	49	49	100.0	61530.59	38494.12	1.03	1.77	100.0
PH	(-LOG(H+(CONCN))	mg/kg	0	7.06	7.76	2	2	100.0	47	47	100.0	7.40	7.17	1.07	1.09	100.0
PPUT	PHOSPHORUS,UNFIL.T.TOTAL	mg/kg	0	33724.34	37595.42	2	2	100.0	43	43	100.0	35607.31	76638.67	1.08	6.91	100.0
RST	RESIDUE, TOTAL	mg/kg	0	26200.00	34100.00	2	2	100.0	50	50	100.0	29890.13	80434.04	1.20	3.23	100.0
RSTLOI	RESIDUE,TOT.LOSS ON IGNI.	mg/kg	0	13200.00	17300.00	2	2	100.0	50	50	100.0	15111.59	43379.33	1.21	3.19	100.0
PHNOL	PHENOLICS (4AAP)	mg/kg	0	248.09	248.09	2	1	50.0	49	41	83.7	60.31	43.05	7.39	3.14	87.9
METALS																
AGUT	SILVER,UNFIL.T.TOTAL	mg/kg	0	72.73	89.69	2	2	100.0	44	44	100.0	80.77	37.78	1.16	2.33	100.0
ALUT	ALUMINUM,UNFIL.T.TOTAL	mg/kg	0	7331.38	8020.61	2	2	100.0	50	50	100.0	7668.25	10715.94	1.07	2.82	100.0
ASUT	ARSENIC,UNFIL.T.TOTAL	mg/kg	0	5.87	6.87	2	2	100.0	50	49	98.0	6.35	5.40	1.12	2.06	97.1
CDUT	CADMIUM,UNFIL.T.TOTAL	mg/kg	0	1.98	2.35	2	2	100.0	45	41	91.1	2.16	10.47	1.13	3.98	90.3
COUT	COBALT,UNFIL.T.TOTAL	mg/kg	0	27.48	27.48	1	1	100.0	39	32	82.1	27.48	9.14	0.00	2.75	85.7
CRUT	CHROMIUM,UNFIL.T.TOTAL	mg/kg	0	762.46	901.53	2	2	100.0	50	50	100.0	829.08	333.06	1.13	3.59	100.0
CUUT	COPPER,UNFIL.T.TOTAL	mg/kg	0	1084.35	1084.35	1	1	100.0	45	45	100.0	1084.35	732.24	0.00	2.16	100.0
HGUT	MERCURY,UNFIL.T.TOTAL	mg/kg	0	2.67	2.93	2	2	100.0	50	49	98.0	2.80	3.24	1.07	2.04	97.1
MOUT	MOLYBDENUM,UNFIL.T.TOTAL	mg/kg	0	9.09	11.45	2	2	100.0	34	23	67.7	10.20	6.41	1.18	2.84	69.2
NIUT	NICKEL,UNFIL.T.TOTAL	mg/kg	0	87.98	109.54	2	2	100.0	45	42	93.3	98.17	72.95	1.17	2.95	90.0
PBUT	LEAD,UNFIL.T.TOTAL	mg/kg	0	224.43	228.74	2	2	100.0	50	49	98.0	226.57	196.62	1.01	2.46	97.1
SEUT	SELENIUM,UNFIL.T.TOTAL	mg/kg	0	2.64	4.96	2	2	100.0	50	48	96.0	3.62	2.67	1.56	2.98	97.1
SRUT	STRONTIUM,UNFIL.T.TOTAL	mg/kg	0	199.12	239.69	2	2	100.0	50	50	100.0	218.47	240.93	1.14	2.54	100.0
ZNUT	ZINC,UNFIL.T.TOTAL	mg/kg	0	967.74	1205.34	2	2	100.0	50	50	100.0	1080.03	988.90	1.17	2.57	100.0
DIOXINS AND FURANS																
P96CDD	OCTACHLORODIBENZODIOXIN	ug/kg	1	2.90	2.90	2	1	50.0	49	26	53.1	7.40	7.10	3.79	3.84	64.7
PESTICIDES,HERBICIDES,PCBS																
P1ALDR	ALDRIN	ug/kg	1	34.40	34.40	2	1	50.0	50	11	22.0	10.00	5.30	5.75	2.67	26.5
P1BHCA	ALPHA-BHC(HEXACHLORCYCLOHEXANE)	ug/kg	1	53.40	53.40	2	1	50.0	50	11	22.0	12.40	5.60	7.85	3.00	32.4
P1BHCB	BETA-BHC (HEXACHLORCYCLOHEXANE)	ug/kg	1	106.90	106.90	2	1	50.0	50	19	38.0	17.60	8.80	12.82	4.39	47.1
P1BHCD	DELTA-BHC(HEXACHLORCYCLOHEXANE)	ug/kg	1	11.50	11.50	2	1	50.0	50	4	8.0	5.80	3.90	2.65	1.93	11.8
P1BHCG	GAMMA-BHC(HEXACHLORCYCLOHEXANE)	ug/kg	2	57.30	57.30	2	1	50.0	50	12	24.0	12.90	5.70	8.25	3.13	35.3
P1CHLO	GAMMA-CHLORDANE	ug/kg	1	26.70	26.70	2	1	50.0	50	21	42.0	8.80	6.80	4.81	2.58	52.9
P1DHL	DIELDRIN	ug/kg	2	7.60	7.60	2	1	50.0	50	15	30.0	4.70	6.50	1.98	3.51	38.2
P1DMOT	METHOXYCHLOR	ug/kg	1	7633.60	7633.60	2	1	50.0	50	15	30.0	335.00	34.10	83.19	4.42	38.2
P1ENDS	ENDOSULFAN SULPHATE	ug/kg	3	362.60	362.60	2	1	50.0	50	6	12.0	65.10	17.50	11.34	2.53	17.7
P1HEPT	HEPTACHLOR	ug/kg	3	19.10	19.10	2	1	50.0	50	9	18.0	7.40	4.70	3.79	2.20	23.5
P1MIRX	MIREX	ug/kg	1	11.50	11.50	2	1	50.0	50	8	16.0	5.80	4.90	2.65	2.52	17.7
P1OCHL	OXYCHLORDANE	ug/kg	2	26.70	26.70	2	1	50.0	50	6	12.0	8.80	6.20	4.81	2.24	17.7
P1PCBT	PCB, TOTAL	ug/kg	2	72.50	72.50	2	1	50.0	50	32	64.0	29.10	114.10	3.63	4.58	67.7
P1PPDE	PP-DDE	ug/kg	1	22.90	22.90	2	1	50.0	50	34	68.0	8.10	11.10	4.31	2.72	73.5
P1PPDT	PP-DDT	ug/kg	3	45.80	45.80	2	1	50.0	50	5	10.0	23.10	16.70	2.62	2.14	14.7
P245T	2,4,5-TRICHLORPHENOXYACETIC ACID	ug/kg	3	160.30	160.30	2	1	50.0	50	16	32.0	48.50	84.40	5.42	3.13	41.2
P24D	2,4-DICHLOROPHENOXYACETIC ACID	ug/kg	3	763.40	763.40	2	1	50.0	50	25	50.0	67.10	75.00	31.14	5.81	64.7

PLANT NAME : Peterborough
PLANT TYPE : Secondary

SAMPLING TYPE : Treated Sludge
SAMPLE FORM : Dry Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS (DRY WEIGHT)	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
P35II.V	SILVEX	ug/g	3	419.80	419.80	2	1	50.0	50	18	36.0	78.60	92.70	10.70	2.94	44.1
X2124	1,2,4-TRICHLOROBENZENE	ug/g	3	80.20	80.20	2	1	50.0	50	22	44.0	15.30	14.80	10.46	5.02	52.9
X2HCB	HEXACHLOROBENZENE	ug/g	2	42.00	42.00	2	1	50.0	50	21	42.0	11.00	7.00	6.62	2.96	55.9
X2HCE	HEXACHLOROETHANE	ug/g	3	11.50	11.50	2	1	50.0	50	1	2.0	5.80	3.70	2.65	1.94	2.9

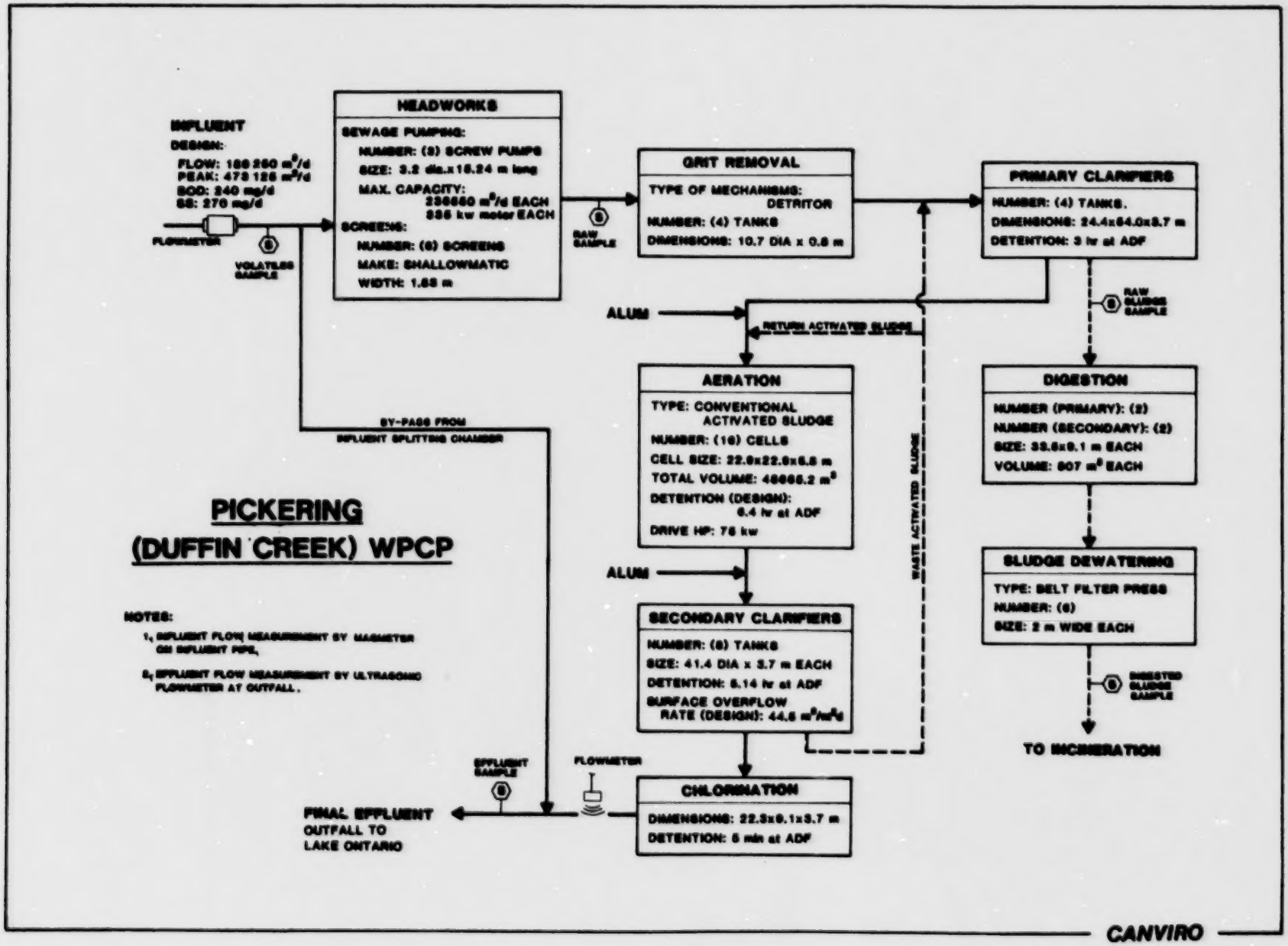
Sub-Appendix A-23

Pickering (Duffin Creek) WPCP

Contents:

- Plant Schematic with Design Characteristics
- Annual Data Review (1981 - 1986 Plant Performance)
- Sources of Municipal Water Pollution Control Plant Raw Sewage
- Operational Evaluation for Pickering (Duffin Creek) WPCP
- Analytical Data

(KIR18/28A)


INFLUENT
DESIGN:
FLOW: 189 250 m³/d
PEAK: 473 126 m³/d
BOD: 240 mg/d
SS: 270 mg/d
FLOWMETER
VOLATILES SAMPLE
HEADWORKS
SEWAGE PUMPING:
NUMBER: (3) SCREW PUMPS
SIZE: 3.2 dia.x16.24 m long
MAX. CAPACITY: 236650 m³/d EACH
336 kw motor EACH
SCREENS:
NUMBER: (6) SCREENS
MAKE: SHALLOWMATIC
WIDTH: 1.68 m
RAW SAMPLE
GRIT REMOVAL
TYPE OF MECHANISMS: DETRITOR
NUMBER: (4) TANKS
DIMENSIONS: 10.7 DIA x 0.8 m
PRIMARY CLARIFIERS
NUMBER: (4) TANKS.
DIMENSIONS: 24.4x64.0x3.7 m
DETENTION: 3 hr at ADF
RAW SLUDGE SAMPLE
ALUM
RETURN ACTIVATED SLUDGE
AERATION
TYPE: CONVENTIONAL ACTIVATED SLUDGE
NUMBER: (16) CELLS
CELL SIZE: 22.0x22.0x5.8 m
TOTAL VOLUME: 46666.2 m³
DETENTION (DESIGN): 6.4 hr at ADF
DRIVE HP: 76 kw
DIGESTION
NUMBER (PRIMARY): (2)
NUMBER (SECONDARY): (2)
SIZE: 33.6x9.1 m EACH
VOLUME: 807 m³ EACH
BY-PASS FROM INFLUENT SPLITTING CHAMBER
WASTE ACTIVATED SLUDGE
ALUM
SECONDARY CLARIFIERS
NUMBER: (6) TANKS
SIZE: 41.4 DIA x 3.7 m EACH
DETENTION: 6.14 hr at ADF
SURFACE OVERFLOW RATE (DESIGN): 44.6 m³/m²d
SLUDGE DEWATERING
TYPE: BELT FILTER PRESS
NUMBER: (6)
SIZE: 2 m WIDE EACH
DIGESTED SLUDGE SAMPLE
TO INCINERATION
EFFLUENT SAMPLE
FLOWMETER
CHLORINATION
DIMENSIONS: 22.3x9.1x3.7 m
DETENTION: 5 min at ADF
FINAL EFFLUENT OUTFALL TO LAKE ONTARIO
PICKERING
(DUFFIN CREEK) WPCP
NOTES:
1. INFLUENT FLOW MEASUREMENT BY MAGMETER ON INFLUENT PIPE.
2. EFFLUENT FLOW MEASUREMENT BY ULTRASONIC FLOWMETER AT OUTFALL.
CANVIRO

YORK-DURHAM WPCP
Conventional Activated Sludge
Phosphorus Removal - Continuous
Capacity - 181.848 10(3)m3/day

PARAMETER	1981	1982	1983	1984	1985	MEAN ANNUAL AVERAGE
Avg. Daily Flow (1000 m3/day)	41.37	84.51	95.12	121.13	150.00	98.43
BOD5 - Influent (mg/L)	200.50	124.10	193.97	159.00	144.24	164.00
BOD5 - Effluent (mg/L)	14.90	14.10	22.40	12.01	14.20	15.74
Annual BOD5 Significantly Different from Mean Annual Average BOD5?	I.D.	I.D.	I.D.	I.D.	I.D.	
TSS - Influent (mg/L)	246.00	183.60	287.90	252.04	251.30	244.36
TSS - Effluent (mg/L)	18.00	12.20	25.17	15.92	15.59	17.38
Annual TSS Significantly Different from Mean Annual Average TSS?	I.D.	I.D.	I.D.	I.D.	I.D.	
Total P - Influent (mg/L)	7.00	7.01	8.00	7.19	6.13	7.00
Total P - Effluent (mg/L)	0.90	1.75	1.73	0.90	1.05	1.30
Annual TP Significantly Different from Mean Annual Average TP?	I.D.	I.D.	I.D.	I.D.	I.D.	
TP in Compliance?	Y	N	N	Y	N	N

I.D. - Insufficient Data

R
R

SOURCES OF MUNICIPAL WATER POLLUTION CONTROL PLANT RAW SEWAGE

GENERAL DESCRIPTION OF WATER POLLUTION CONTROL PLANT (WPCP)

NAME OF WPCP	DUFFIN CREEK WPCP
WORKS NUMBER	120001915
TREATMENT TYPE	CONVENTIONAL ACTIVATED SLUDGE PHOSPHORUS REMOVAL CONTINUOUS
DESIGN CAPACITY (1000 m3/d)	181.840
1986 AVERAGE DAY FLOW (1000 m3/d)	163.179
POPULATION SERVED	64386

% OF TOTAL FLOW ATTRIBUTED TO:

INDUSTRIAL SOURCES (%)	25
COMMERCIAL SOURCES (%) (Population x 0.0757)	3
RESIDENTIAL SOURCES (%) (Population x 0.175)	7
UNACCOUNTED FOR, INCL. INFILTRATION (100-% Contributed from industrial, commercial and residential sources)	65

PROFILE OF INDUSTRIES IN CATCHMENT

TOTAL NO OF INDUSTRIES	1185
INDUSTRIES WITH WATER	146
NO OF SIC CATEGORIES	55

DESCRIPTION OF THE TOP 5 INDUSTRIES DISCHARGED TO THE WPCP (BASED ON WATER USE DATA)

DESCRIPTION	SIC	# OF COMPANIES
PLASTICS MOLDING	3070-3079	46
METAL FINISHING	3411-3469	75
PRINTING/PUBLISHING	2700-2799	162
WOOD/METAL FURNITURE MFG	2510-2599	62
NONFERROUS METALS FORMING MFG	3331-3369	8

OPERATIONAL EVALUATION FOR: PICKERING (DUFFIN CREEK) WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: April 3, 1987
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: 189,250 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
RAW SEWAGE FLOW	169,940	175,920	149,610	168,390	163,790	166,000	156,170
% of Design Flow	89.80%	92.96%	79.05%	88.98%	86.28%	87.71%	82.52%
Influent BOD (mg/L)					140.0		
Primary BOD (mg/L)					110.0		
Secondary BOD (mg/L)					12.0		
% PRIMARY REMOVAL					21.4		
% SECONDARY REMOVAL					91.4		
Influent SS (mg/L)	205.0	229.0	224.0	284.0	229.0	230.0	230.0
Primary SS (mg/L)	83.0	99.0	90.0	120.0	84.0		
Secondary SS (mg/L)	5.0	5.0	7.0	3.0	4.0	9.0	5.0
% PRIMARY REMOVAL	59.5	56.8	59.8	57.7	63.3		
% SECONDARY REMOVAL	97.6	97.8	96.9	98.9	98.3	96.1	97.8
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)	5.50		10.80		8.90		
Primary Total P (mg/L)							
Secondary Total P (mg/L)	0.23	0.50	0.30	0.50	0.20	0.78	0.20
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	95.8		97.2		97.8		

OPERATIONAL EVALUATION FOR: PICKERING (DUFFIN CREEK) WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: April 3, 1987
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: 189,250 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 8	DAY 9	DAY 10	DAY 11	DAY 12	DAY 13	DAY 14
RAW SEWAGE FLOW	168,370	168,550	154,690	178,270	168,880	161,910	162,720
% of Design Flow	88.97%	89.06%	81.74%	94.20%	89.24%	85.55%	85.98%
Influent BOD (mg/L)				216.0			
Primary BOD (mg/L)							
Secondary BOD (mg/L)				22.0			
% PRIMARY REMOVAL							
% SECONDARY REMOVAL				89.8			
Influent SS (mg/L)	233.0	202.0	235.0	248.0	214.0	197.0	190.0
Primary SS (mg/L)	139.0	221.0	108.0	94.0	97.0		
Secondary SS (mg/L)	9.0	9.0	9.0	25.0	1.0	4.0	5.0
% PRIMARY REMOVAL	40.3	-9.4	54.0	62.1	54.7		
% SECONDARY REMOVAL	96.1	95.5	96.2	89.9	99.5	98.0	97.4
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)	6.08				7.75		
Primary Total P (mg/L)							
Secondary Total P (mg/L)	0.20	0.05	0.15		0.10	0.08	0.08
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	96.7				98.7		

OPERATIONAL EVALUATION FOR: PICKERING (DUFFIN CREEK) WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: April 3, 1987
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: 189,250 m3/d

PARAMETER	SAMPLING PERIOD						
	DAY 15	DAY 16	DAY 17	DAY 18	DAY 19	DAY 20	DAY 21
RAW SEWAGE FLOW	198,440	186,560	203,570	233,090	253,630		
% of Design Flow	104.86%	98.58%	107.57%	123.17%	134.02%		
Influent BOD (mg/L)			143.0	95.0	112.0		
Primary BOD (mg/L)			50.0	85.0	84.0		
Secondary BOD (mg/L)			13.0	16.0	54.0		
% PRIMARY REMOVAL			65.0	10.5	25.0		
% SECONDARY REMOVAL			90.9	83.2	51.8		
Influent SS (mg/L)	197.0	209.0	158.0	141.0	209.0		
Primary SS (mg/L)	102.0	112.0	97.0	122.0	71.0		
Secondary SS (mg/L)	5.0	4.0	9.0	5.0	5.0		
% PRIMARY REMOVAL	48.2	46.4	38.6	13.5	66.0		
% SECONDARY REMOVAL	97.5	98.1	94.3	96.5	97.6		
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)	6.48		11.00		7.40		
Primary Total P (mg/L)							
Secondary Total P (mg/L)	0.04		0.30	0.10	0.20		
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	99.4		97.3		97.3		

OPERATIONAL EVALUATION FOR: PICKERING (DUFFIN CREEK) WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: May 22, 1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 189,250 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
RAW SEWAGE FLOW	157,050	167,080	163,530	165,220	163,740	156,680	158,100
% of Design Flow	82.99%	88.29%	86.41%	87.30%	86.52%	82.79%	83.54%
Influent BOD (mg/L)			153.0	189.0	384.0		
Primary BOD (mg/L)			203.0	35.0	182.0		
Secondary BOD (mg/L)			43.0	37.0	25.0		
% PRIMARY REMOVAL			-32.7	81.5	52.8		
% SECONDARY REMOVAL			71.9	80.4	93.5		
Influent SS (mg/L)	257.0	306.0	218.0	298.0	228.0	265.0	212.0
Primary SS (mg/L)	357.0	319.0	332.0	320.0	493.0		
Secondary SS (mg/L)	12.0	14.0	17.0	321.0	3.0	68.0	15.0
% PRIMARY REMOVAL	-38.9	-4.2	-52.3	-7.4	-116.2		
% SECONDARY REMOVAL	95.3	95.4	92.2	-7.7	98.7	74.3	92.9
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)	6.76		7.98		5.08		
Primary Total P (mg/L)							
Secondary Total P (mg/L)	0.68		1.02		0.83		
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	89.9		87.2		83.7		

OPERATIONAL EVALUATION FOR: PICKERING (DUFFIN CREEK) WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: May 22, 1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 189,250 m3/d

PARAMETER	PRE-SAMPLING PERIOD						
	DAY 8	DAY 9	DAY 10	DAY 11	DAY 12	DAY 13	DAY 14
RAW SEWAGE FLOW	160,140	163,179	163,520	170,620	172,750	142,910	135,280
% of Design Flow	84.62%	86.22%	86.40%	90.16%	91.28%	75.51%	71.48%
Influent BOD (mg/L)				172.0	213.0		
Primary BOD (mg/L)				38.0	88.0		
Secondary BOD (mg/L)				3.0	8.0		
% PRIMARY REMOVAL				77.9	58.7		
% SECONDARY REMOVAL				98.3	96.2		
Influent SS (mg/L)	202.0	274.0	271.0	258.0	215.0	237.0	237.0
Primary SS (mg/L)	750.0	331.0	133.0	94.0	56.0		
Secondary SS (mg/L)	21.0	25.0	19.0	9.0	8.0	28.0	28.0
% PRIMARY REMOVAL	-271.3	-20.8	50.9	63.6	74.0		
% SECONDARY REMOVAL	89.6	90.9	93.0	96.5	96.3	88.2	88.2
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)		8.25	9.84		6.91		
Primary Total P (mg/L)		6.98	8.44		3.89		
Secondary Total P (mg/L)		0.81	1.50	0.46			
% PRIMARY REMOVAL		15.4	14.2		43.7		
% SECONDARY REMOVAL		90.2	84.8				

OPERATIONAL EVALUATION FOR: PICKERING (DUFFIN CREEK) WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: May 22, 1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 189,250 m3/d

PARAMETER	SAMPLING PERIOD						
	DAY 15	DAY 16	DAY 17	DAY 18	DAY 19	DAY 20	DAY 21
RAW SEWAGE FLOW	144,060	166,320	166,590	151,850	161,760		
% of Design Flow	76.12%	87.88%	88.03%	80.24%	85.47%		
Influent BOD (mg/L)							
Primary BOD (mg/L)							
Secondary BOD (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent SS (mg/L)	237.0	222.0	156.0	166.0	195.0		
Primary SS (mg/L)		91.0	412.0	59.0	304.0		
Secondary SS (mg/L)	28.0	22.0	23.0	12.0	11.0		
% PRIMARY REMOVAL		59.0	-164.1	64.5	-55.9		
% SECONDARY REMOVAL	88.2	90.1	85.3	92.8	94.4		
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)			5.44		7.93		
Primary Total P (mg/L)			6.60		9.99		
Secondary Total P (mg/L)		0.60		0.60			
% PRIMARY REMOVAL			-21.3		-26.0		
% SECONDARY REMOVAL							

PLANT NAME : Pickering (Duffin Creek)
PLANT TYPE : Secondary

SAMPLING TYPE : Raw Sewage
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	PLANT MIN. CONC. > MDL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0	47.00	240.00	10	10	100.0	267	266	99.6	115.47	140.23	1.69	1.93	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0	174.00	490.00	10	10	100.0	260	258	99.2	298.93	287.75	1.49	1.82	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0	16.00	27.00	10	10	100.0	271	271	100.0	20.30	22.39	1.20	1.81	100.0
NNHTPR	AMMONIUM,TOTAL FILT.REAC.	mg/L	0	14.20	21.20	10	10	100.0	275	274	99.6	17.64	15.37	1.18	1.69	100.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0	24.00	37.20	10	10	100.0	273	273	100.0	29.87	25.44	1.20	1.47	100.0
PH	(-LOG(H+(CONCN))		0	6.80	7.25	10	10	100.0	275	275	100.0	7.02	6.90	1.03	1.05	100.0
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/L	0	4.20	6.70	5	5	100.0	248	248	100.0	5.32	5.18	1.19	1.51	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0	28.00	212.00	10	10	100.0	267	266	99.6	102.29	126.88	1.83	1.93	100.0
NNO2PR	NITRITE,FILT. REACT.	mg/L	0	0.05	0.97	10	5	50.0	271	58	21.4	0.03	0.01	10.05	2.98	51.4
NNOTPR	NITRATES,TOTAL FILT.REAC.	mg/L	0	0.75	2.30	10	3	30.0	275	28	10.2	0.14	0.05	5.06	2.33	32.4
PHNOL	PHENOLICS (4AAP)	mg/L	0	0.60	0.70	10	2	20.0	275	37	13.5	0.26	0.31	2.01	2.05	37.8
METALS																
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	1100.00	5900.00	11	11	100.0	322	306	95.0	2400.00	1000.10	1.77	2.65	97.3
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	30.00	500.00	11	11	100.0	322	237	73.6	230.00	51.10	2.47	3.44	89.2
CUUT	COPPER,UNFILT.TOTAL	ug/L	0	340.00	340.00	1	1	100.0	49	48	98.0	340.00	110.60	0.00	2.28	97.1
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	0.13	0.48	10	10	100.0	283	274	96.8	0.24	0.23	1.64	2.11	100.0
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	230.00	340.00	11	11	100.0	319	318	99.7	290.00	370.70	1.12	2.14	100.0
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	100.00	500.00	11	11	100.0	322	315	97.8	300.00	211.00	1.59	2.94	100.0
CCNPUR	CYANIDE-FREE,UNFILT.REAC.	ug/L	0	10.00	70.00	10	9	90.0	271	82	30.3	20.00	1.90	2.47	6.88	32.4
NIUT	NICKEL,UNFILT.TOTAL	ug/L	0	70.00	380.00	11	7	63.6	322	103	32.0	90.00	38.80	2.97	2.70	54.1
PBUT	LEAD,UNFILT.TOTAL	ug/L	0	110.00	240.00	11	5	45.5	322	57	17.7	90.00	59.50	2.03	1.86	51.4
AGUT	SILVER,UNFILT.TOTAL	ug/L	0	20.00	30.00	11	4	36.4	321	82	25.6	10.00	10.40	2.25	2.55	75.7
COUT	COBALT,UNFILT.TOTAL	ug/L	0	20.00	50.00	11	3	27.3	322	82	25.5	10.00	9.30	2.28	2.31	83.8
MOUT	MOLYBDENUM,UNFILT.TOTAL	ug/L	0	30.00	30.00	11	1	9.1	321	41	12.8	10.00	12.40	1.39	1.72	56.8
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PMMCRE	M-CRESOL	ug/L	1	19.60	326.60	10	5	50.0	275	167	60.7	18.84	25.59	3.38	3.45	86.5
PMPHEN	PHENOL	ug/L	2	42.00	42.00	10	1	10.0	275	118	42.9	8.91	14.52	1.72	2.46	78.4
PESTICIDES,HERBICIDES,PCBS																
P324D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	0.16	1.00	10	10	100.0	276	214	77.5	0.36	0.13	1.82	3.72	100.0
P1BHCG	GAMMA- BHC(HEXCHLORCYCLHEXANE)	ug/L	2	0.02	0.04	10	7	70.0	276	143	51.8	0.02	0.02	1.64	2.29	94.6
P1ENDS	ENDOSULFAN SULPHATE	ug/L	3	0.27	0.56	10	3	30.0	276	13	4.7	0.08	0.04	3.21	1.56	16.2
P1BHCB	BETA-BHC (HEXCHLORCYCLHEXANE)	ug/L	1	0.02	0.03	10	2	20.0	276	32	11.6	0.01	0.01	1.48	1.66	35.1
P1DMDT	METHOXYCHLOR	ug/L	1	0.20	0.20	10	2	20.0	276	47	17.0	0.07	0.08	1.79	3.14	43.2
P1PPDE	PP-DDE	ug/L	1	0.06	0.22	10	2	20.0	276	15	5.4	0.02	0.01	2.93	1.74	24.3
P1PCBT	PCB, TOTAL	ug/L	2	0.17	0.17	10	1	10.0	276	42	15.2	0.05	0.06	2.43	2.31	46.0
VOLATILES ORGANIC COMPOUNDS																
X1ACRO	ACROLEIN	ug/L	3	9200.00	9200.00	10	1	10.0	274	1	0.4	293.30	202.81	3.36	1.26	2.7
X1CHLO	CHLOROFORM	ug/L	1	110.00	110.00	10	1	10.0	274	28	10.2	23.72	23.90	1.71	1.75	32.4

PLANT NAME : Pickering (Duffin Creek)
PLANT TYPE : Secondary

SAMPLING TYPE : Raw Sewage
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	PLANT MIN. CONC. > MDL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0	47.00	240.00	10	10	100.0	267	266	99.6	115.47	140.23	1.69	1.93	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0	174.00	490.00	10	10	100.0	260	258	99.2	298.93	287.75	1.49	1.82	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0	16.00	27.00	10	10	100.0	271	271	100.0	20.30	22.39	1.20	1.81	100.0
NNHTPR	AMMONIUM,TOTAL FILT.REAC.	mg/L	0	14.20	21.20	10	10	100.0	275	274	99.6	17.64	15.37	1.18	1.69	100.0
NNTKUR	NITROGEN-TOT-KJEL.,UNF.TOT	mg/L	0	34.00	37.20	10	10	100.0	273	273	100.0	29.87	25.44	1.20	1.47	100.0
PH	(-LOG(H+(CONCN))		0	6.80	7.25	10	10	100.0	275	275	100.0	7.02	6.90	1.03	1.05	100.0
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/L	0	4.20	6.70	5	5	100.0	248	248	100.0	5.32	5.18	1.19	1.51	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0	28.00	212.00	10	10	100.0	267	266	99.6	102.29	126.88	1.83	1.93	100.0
NNO2PR	NITRITE,FILT. REACT.	mg/L	0	0.05	0.97	10	5	50.0	271	58	21.4	0.03	0.01	10.05	2.98	51.4
NNOTPR	NITRATES,TOTAL FILT.REAC.	mg/L	0	0.75	2.30	10	3	30.0	275	28	10.2	0.14	0.05	5.06	2.33	32.4
PHNOL	PHENOLICS (4AAP)	mg/L	0	0.60	0.70	10	2	20.0	275	37	13.5	0.26	0.31	2.01	2.05	37.8
METALS																
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	1100.00	5900.00	11	11	100.0	322	306	95.0	2400.00	1000.10	1.77	2.65	97.3
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	30.00	500.00	11	11	100.0	322	237	73.6	230.00	51.10	2.47	3.44	89.2
CUUT	COPPER,UNFILT.TOTAL	ug/L	0	340.00	340.00	1	1	100.0	49	48	98.0	340.00	110.60	0.00	2.28	97.1
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	0.13	0.48	10	10	100.0	283	274	96.8	0.24	0.23	1.64	2.11	100.0
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	230.00	340.00	11	11	100.0	319	318	99.7	290.00	370.70	1.12	2.14	100.0
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	100.00	500.00	11	11	100.0	322	315	97.8	300.00	211.00	1.59	2.94	100.0
CCNPUR	CYANIDE-FREE,UNFILT.REAC.	ug/L	0	10.00	70.00	10	9	90.0	271	82	30.3	20.00	1.90	2.47	6.88	32.4
NIUT	NICKEL,UNFILT.TOTAL	ug/L	0	70.00	380.00	11	7	63.6	322	103	32.0	90.00	38.80	2.97	2.70	54.1
PBUT	LEAD,UNFILT.TOTAL	ug/L	0	110.00	240.00	11	5	45.5	322	57	17.7	90.00	59.50	2.03	1.86	51.4
AGUT	SILVER,UNFILT.TOTAL	ug/L	0	20.00	30.00	11	4	36.4	321	82	25.6	10.00	10.40	2.25	2.55	75.7
COUT	COBALT,UNFILT.TOTAL	ug/L	0	20.00	50.00	11	3	27.3	322	82	25.5	10.00	9.30	2.28	2.31	83.8
MOUT	MOLYBDENUM,UNFILT.TOTAL	ug/L	0	30.00	30.00	11	1	9.1	321	41	12.8	10.00	12.40	1.39	1.72	56.8
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PMMCRS	M-CRESOL	ug/L	1	19.60	326.60	10	5	50.0	275	167	60.7	18.84	25.59	3.38	3.45	86.5
PMPHEN	PHENOL	ug/L	2	42.00	42.00	10	1	10.0	275	118	42.9	8.91	14.52	1.72	2.46	78.4
PESTICIDES,HERBICIDES,PCBS																
P24D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	0.16	1.00	10	10	100.0	276	214	77.5	0.36	0.13	1.82	3.72	100.0
P1BHCG	GAMMA-BHC(HEXACHLORCYCLOHEXANE)	ug/L	2	0.02	0.04	10	7	70.0	276	143	51.8	0.02	0.02	1.64	2.29	94.6
P1ENDS	ENDOSULFAN SULPHATE	ug/L	3	0.27	0.56	10	3	30.0	276	13	4.7	0.08	0.04	3.21	1.56	16.2
P1BHCB	BETA-BHC (HEXACHLORCYCLOHEXANE)	ug/L	1	0.02	0.03	10	2	20.0	276	32	11.6	0.01	0.01	1.48	1.66	35.1
P1DMDT	METHOXYCHLOR	ug/L	1	0.20	0.20	10	2	20.0	276	47	17.0	0.07	0.08	1.79	3.14	43.2
P1PPDE	PP-DDE	ug/L	1	0.06	0.22	10	2	20.0	276	15	5.4	0.02	0.01	2.93	1.74	24.3
P1PCBT	PCB, TOTAL	ug/L	2	0.17	0.17	10	1	10.0	276	42	15.2	0.05	0.06	2.43	2.31	46.0
VOLATILES ORGANIC COMPOUNDS																
V1ACRO	ACROLEIN	ug/L	3	9200.00	9200.00	10	1	10.0	274	1	0.4	293.30	202.81	3.36	1.26	2.7
V1CHLO	CHLOROFORM	ug/L	1	110.00	110.00	10	1	10.0	274	28	10.2	23.72	23.90	1.71	1.75	32.4

PLANT NAME : Pickering (Duffin Creek)
PLANT TYPE : Secondary

SAMPLING TYPE : Final Effluent
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	STD. FOR SURFACE WATER	STD. REF.	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET.	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																		
COD	CHEMICAL OXYGEN DEMAND	mg/L	0		-	38.00	88.00	10	10	100.0	213	211	99.1	57.98	52.80	1.34	1.83	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0		-	6.20	10.40	10	10	100.0	220	220	100.0	8.43	8.09	1.21	1.60	100.0
NNHTPR	AMMONIUM,TOTAL FILT.REAC.	mg/L	0		-	5.20	25.80	10	10	100.0	223	204	91.5	11.48	3.90	1.74	6.98	100.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0		-	6.50	29.50	10	10	100.0	222	222	100.0	15.11	7.97	1.67	2.71	100.0
PH	(-LOG(H+(CONCN))		0		-	6.38	7.41	10	10	100.0	224	224	100.0	7.01	7.10	1.04	1.05	100.0
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/L	0		-	0.26	2.40	6	6	100.0	211	206	97.6	0.94	0.68	2.48	1.97	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0		-	7.20	65.00	10	10	100.0	220	219	99.6	21.26	10.12	2.05	2.00	100.0
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0		-	7.60	59.30	10	9	90.0	213	211	99.1	22.97	21.22	2.62	2.07	100.0
NNO2PR	NITRITE,FILT. REACT.	mg/L	0		-	0.50	1.17	10	9	90.0	220	194	88.2	0.41	0.22	6.08	5.95	96.4
NNOTPR	NITRATES,TOTAL FILT.REAC.	mg/L	0		-	5.90	17.20	10	9	90.0	224	186	83.0	6.16	2.33	7.25	7.75	96.4
PHNOL	PHENOLICS (4AAP)	mg/L	0	0.00	ONT-MOE	0.23	0.47	10	2	20.0	225	33	14.7	0.09	0.07	2.42	1.86	53.6
METALS																		
CUUT	COPPER,UNFILT.TOTAL	ug/L	0	5.00	ONT-MOE	20.00	30.00	2	2	100.0	47	30	63.8	20.00	13.10	1.33	2.56	77.8
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	0.20	ONT-MOE	0.01	0.08	10	10	100.0	233	220	94.4	0.03	0.03	1.90	2.62	100.0
NIUT	NICKEL,UNFILT.TOTAL	ug/L	0	25.00	ONT-MOE	90.00	210.00	12	12	100.0	267	171	64.0	140.00	22.10	1.31	3.60	85.7
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	3750.00	ONT-MOE	200.00	290.00	12	12	100.0	267	267	100.0	240.00	340.90	1.12	2.14	100.0
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	30.00	ONT-MOE	50.00	160.00	12	12	100.0	267	262	98.1	80.00	53.30	1.49	2.48	100.0
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	75.00	ONT-MOE	70.00	490.00	12	11	91.7	264	196	74.2	140.00	101.70	2.38	3.72	96.4
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	100.00	ONT-MOE	10.00	90.00	12	11	91.7	267	137	51.3	20.00	9.00	2.58	2.00	89.3
CDUT	CADMIUM,UNFILT.TOTAL	ug/L	0	0.20	ONT-MOE	0.00	10.00	12	5	41.7	267	65	24.3	0.00	2.10	1.87	2.07	71.4
CCNFUR	CYANIDE-FREE,UNFILT.REAC.	ug/L	0	5.00	ONT-MOE	10.00	20.00	10	4	40.0	222	42	18.9	0.00	1.30	2.74	3.68	46.4
COUT	COBALT,UNFILT.TOTAL	ug/L	0	5.00	NYS-STD	10.00	20.00	12	3	25.0	266	65	24.4	10.00	6.40	1.59	1.54	82.1
MOUT	MOLYBDENUM,UNFILT.TOTAL	ug/L	0		-	10.00	10.00	12	3	25.0	267	75	28.1	10.00	6.60	1.37	1.56	67.9
PBUT	LEAD,UNFILT.TOTAL	ug/L	0	25.00	ONT-MOE	30.00	30.00	12	2	16.7	267	25	9.4	20.00	16.50	1.36	1.48	60.7
AGUT	SILVER,UNFILT.TOTAL	ug/L	0	0.10	ONT-MOE	10.00	10.00	12	1	8.3	267	15	5.6	10.00	6.90	1.63	1.84	32.1
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																		
PMPCMC	P-CHLORO-M-CRESOL	ug/L	1		-	5.30	5.30	10	1	10.0	227	2	0.9	2.70	2.68	1.27	1.50	7.1
DIOXINS AND FURANS																		
P94CDF	TETRACHLORODIBENZOFURAN	ug/L	2	0.03	ONT-MOE	0.33	0.33	2	1	50.0	44	1	2.3	0.13	0.15	3.80	3.90	3.6
PESTICIDES,HERBICIDES,PCBS																		
P324D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	4.00	ONT-MOE	0.02	0.65	10	10	100.0	227	177	78.0	0.17	0.08	2.59	4.71	100.0
P1BHCG	GAMMA- BHC(HEXACHLORCYCLOHEXANE)	ug/L	2	0.06	ONT-MOE	0.01	0.03	10	9	90.0	227	157	69.2	0.02	0.02	1.71	2.48	98.4
P1END8	ENDOSULFAN SULPHATE	ug/L	3		-	0.10	0.17	10	2	20.0	227	3	1.3	0.03	0.02	2.23	1.22	7.1
P1PPD8	PP-DDE	ug/L	1	0.00	ONT-MOE	0.02	0.04	10	2	20.0	227	7	3.1	0.01	0.01	2.11	1.28	17.9
VOLATILES ORGANIC COMPOUNDS																		
X111CE	1,1-DICHLOROETHANE	ug/L	1	50.00	NYS-GUL	2.30	2.30	10	1	10.0	234	3	1.3	1.09	1.01	1.30	1.10	10.7

PLANT NAME : Pickering (Duffin Creek)
PLANT TYPE : Secondary

SAMPLING TYPE : Final Effluent
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	STD. FOR SURFACE WATER	STD. REF.	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET.	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
VOLATILES ORGANIC COMPOUNDS																		
X112CE	1,2-DICHLOROETHANE	ug/L	1	0.80	NYS-STD	10.00	10.00	10	1	10.0	224	4	1.8	1.26	1.03	2.07	1.30	10.7
X1CDCE	CIS-1,2-DICHLOROETHYLENE	ug/L	1	0.07	NYS-GUL	4.10	4.10	10	1	10.0	224	2	0.9	1.15	1.01	1.56	1.11	7.1
X1CHLO	CHLOROFORM	ug/L	1	0.20	NYS-STD	6.70	6.70	10	1	10.0	224	37	16.5	1.21	1.37	1.82	2.18	64.3

PLANT NAME : Pickering (Duffin Creek)
PLANT TYPE : Secondary

SAMPLING TYPE : Raw Sludge
SAMPLE FORM : Dry Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS (DRY WEIGHT)	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
COD	CHEMICAL OXYGEN DEMAND	mg/kg	0	1158081.71	1301369.86	2	2	100.0	45	45	100.0	1227637.01	892221.45	1.09	3.19	100.0
NNHTPR	AMMONIUM,TOTAL FILT.REAC.	mg/kg	0	6164.38	6465.36	2	2	100.0	48	47	97.9	6313.08	5911.32	1.03	4.59	100.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/kg	0	30821.92	38987.57	2	2	100.0	51	51	100.0	34665.13	36897.85	1.18	2.98	100.0
PH	(-LOG[H+(CONCN))	mg/kg	0	5.65	5.81	2	2	100.0	49	49	100.0	5.73	6.03	1.02	1.10	100.0
PHNOL	PHENOLICS (4AAP)	mg/kg	0	56.84	109.59	2	2	100.0	50	41	82.0	78.92	82.34	1.59	3.54	85.3
PPUT	PHOSPHORUS,UNFIL.T.TOTAL.	mg/kg	0	34902.31	34902.31	1	1	100.0	42	42	100.0	34902.31	20347.70	0.00	4.43	100.0
RST	RESIDUE, TOTAL	mg/kg	0	56300.00	58400.00	2	2	100.0	51	51	100.0	57340.39	32783.51	1.03	1.81	100.0
RSTLOI	RESIDUE,TOT.LOSS ON IGNI.	mg/kg	0	32000.00	36900.00	2	2	100.0	51	51	100.0	34362.77	20803.05	1.11	1.77	100.0
NNOTPR	NITRATES,TOTAL FILT.REAC.	mg/kg	0	23.98	23.98	2	1	50.0	48	43	89.6	17.55	25.44	1.56	2.21	93.9
METALS																
AGUT	SILVER,UNFIL.T.TOTAL.	mg/kg	0	63.36	67.50	2	2	100.0	45	40	88.9	65.39	30.17	1.05	2.61	86.4
ALUT	ALUMINUM,UNFIL.T.TOTAL.	mg/kg	0	13527.40	14209.59	2	2	100.0	51	51	100.0	13864.30	9835.74	1.04	2.51	100.0
ASUT	ARSENIC,UNFIL.T.TOTAL.	mg/kg	0	6.34	8.53	2	2	100.0	51	50	98.0	7.35	6.13	1.23	2.01	97.1
CDUT	CADMIUM,UNFIL.T.TOTAL.	mg/kg	0	11.55	27.40	2	2	100.0	43	40	93.0	17.79	9.74	1.84	4.35	90.0
CRUT	CHROMIUM,UNFIL.T.TOTAL.	mg/kg	0	1455.48	1492.01	2	2	100.0	51	50	98.0	1473.63	301.43	1.02	3.68	97.1
CUUT	COPPER,UNFIL.T.TOTAL.	mg/kg	0	1044.52	1044.52	1	1	100.0	46	46	100.0	1044.52	608.31	0.00	1.72	100.0
HGUT	MERCURY,UNFIL.T.TOTAL.	mg/kg	0	0.51	2.13	2	2	100.0	50	50	100.0	1.05	2.23	2.74	1.67	100.0
NIUT	NICKEL,UNFIL.T.TOTAL.	mg/kg	0	195.38	222.60	2	2	100.0	46	44	95.7	208.55	59.17	1.10	2.90	93.3
PBUT	LEAD,UNFIL.T.TOTAL.	mg/kg	0	497.34	650.68	2	2	100.0	49	48	98.0	568.87	173.99	1.21	2.24	96.9
SEUT	SELENIUM,UNFIL.T.TOTAL.	mg/kg	0	1.42	2.40	2	2	100.0	50	48	96.0	1.85	3.04	1.45	1.93	93.9
SRUT	STRONTIUM,UNFIL.T.TOTAL.	mg/kg	0	177.62	222.60	2	2	100.0	51	51	100.0	198.84	231.70	1.17	1.97	100.0
ZNUT	ZINC,UNFIL.T.TOTAL.	mg/kg	0	1101.24	1352.74	2	2	100.0	51	51	100.0	1220.53	905.39	1.16	2.39	100.0
MOUT	MOLYBDENUM,UNFIL.T.TOTAL.	mg/kg	0	9.06	9.06	2	1	50.0	37	23	62.2	13.92	5.80	1.84	2.88	64.3
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
P84MCRE	M-CRESOL	ug/kg	1	232682.10	522260.30	2	2	100.0	51	42	82.3	348598.10	116847.30	1.77	12.16	85.3
DIOXINS AND FURANS																
P94CDF	TETRACHLORODIBENZOFURAN	ug/kg	2	5.20	5.20	2	1	50.0	50	3	6.0	2.20	2.40	3.46	2.94	8.8
P97CDD	HEPTACHLORODIBENZODIOXIN	ug/kg	1	5.30	5.30	2	1	50.0	50	6	12.0	9.70	7.20	2.36	4.12	17.7
P98CDD	OCTACHLORODIBENZODIOXIN	ug/kg	1	16.40	16.40	2	1	50.0	50	25	50.0	17.10	8.50	1.08	3.60	58.8
PESTICIDES,HERBICIDES,PCBS																
P1BHCB	BETA-BHC (HEXACHLORCYCLOHEXANE)	ug/kg	1	7.10	10.30	2	2	100.0	51	18	35.3	8.60	7.40	1.50	3.29	38.2
P1BHCG	GAMMA-BHC(HEXACHLORCYCLOHEXANE)	ug/kg	2	5.10	8.90	2	2	100.0	51	28	54.9	6.70	8.90	1.48	2.69	67.7
P1DMDT	METHOXYCHLOR	ug/kg	1	17.80	85.60	2	2	100.0	51	19	37.3	39.00	45.80	3.04	5.15	44.1
P1PPDR	PP-DDR	ug/kg	1	5.10	8.90	2	2	100.0	51	22	43.1	6.70	7.30	1.48	2.31	52.9
P324D	2,4-DICHLOROPHENOXYACETIC ACID	ug/kg	3	104.50	230.90	2	2	100.0	51	38	74.5	155.30	93.20	1.75	6.50	82.3
X2124	1,2,4-TRICHLOROBENZENE	ug/kg	3	17.10	17.80	2	2	100.0	51	17	33.3	17.40	9.30	1.03	4.06	41.2
X2HCB	HEXACHLOROBENZENE	ug/kg	2	3.40	3.60	2	2	100.0	51	17	33.3	3.50	5.60	1.04	2.65	38.2
P1CHLG	GAMMA-CHLORDANE	ug/kg	1	3.60	3.60	2	1	50.0	51	19	37.3	2.50	6.00	1.70	2.44	50.0
P1ENDS	ENDOSULFAN SULPHATE	ug/kg	3	126.30	126.30	2	1	50.0	51	6	11.8	29.10	18.60	7.80	2.80	17.7
P1PCBT	PCB, TOTAL	ug/kg	2	19.50	19.50	2	1	50.0	51	40	78.4	22.40	88.70	1.22	3.18	79.4

PLANT NAME : Pickering (Duffin Creek)
PLANT TYPE : Secondary

SAMPLING TYPE : Raw Sludge
SAMPLE FORM : Dry Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS (DRY WEIGHT)	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
P1PPDD	PP-DDD	ug/kg	1	19.50	19.50	2	1	50.0	51	13	25.5	5.80	5.10	5.61	2.48	35.3
P3SII.V	SILVEX	ug/kg	3	51.40	51.40	2	1	50.0	51	23	45.1	67.60	47.30	1.47	3.40	55.9
VOLATILES ORGANIC COMPOUNDS																
X1CHLO	CHLOROFORM (CHCL3)	ug/kg	1	25972.60	25972.60	2	1	50.0	51	12	23.5	2918.10	1225.10	19.65	4.36	35.3

PLANT NAME : Pickering (Duffin Creek)
PLANT TYPE : Secondary

SAMPLING TYPE : Treated Sludge
SAMPLE FORM : Dry Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS (DRY WEIGHT)	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/kg	0	33299.99	38000.01	2	2	100.0	49	49	100.0	35572.46	38494.12	1.10	1.77	100.0
PH	(-LOG(H+(CONC))	mg/kg	0	7.00	7.60	2	2	100.0	47	47	100.0	7.29	7.17	1.08	1.09	100.0
PHNOL	PHENOLICS (4AAP)	mg/kg	0	18.41	30.85	2	2	100.0	49	41	83.7	23.83	43.05	1.44	3.14	87.9
PPUT	PHOSPHORUS,UNFIL.T.TOTAL	mg/kg	0	34230.00	41320.00	2	2	100.0	43	43	100.0	37608.29	76638.67	1.14	6.91	100.0
RST	RESIDUE, TOTAL	mg/kg	0	295000.00	309600.00	2	2	100.0	50	50	100.0	302211.85	80434.04	1.05	3.23	100.0
RSTLOI	RESIDUE,TOT.LOSS ON IGNI.	mg/kg	0	127440.00	188856.00	2	2	100.0	50	50	100.0	155138.05	43379.33	1.32	3.19	100.0
METALS																
AOUT	SB,VER,UNFIL.T.TOTAL	mg/kg	0	32.58	38.76	2	2	100.0	44	44	100.0	35.53	37.78	1.13	2.33	100.0
ALUT	ALUMINUM,UNFIL.T.TOTAL	mg/kg	0	6782.95	7288.14	2	2	100.0	50	50	100.0	7031.00	10715.94	1.05	2.82	100.0
ASUT	ARSENIC,UNFIL.T.TOTAL	mg/kg	0	1.36	1.94	2	2	100.0	50	49	98.0	1.62	5.40	1.29	2.08	97.1
CDUT	CADMIUM,UNFIL.T.TOTAL	mg/kg	0	6.46	7.80	2	2	100.0	45	41	91.1	7.10	10.47	1.14	3.98	90.3
COUT	COBALT,UNFIL.T.TOTAL	mg/kg	0	3.05	4.85	2	2	100.0	39	32	82.1	3.84	9.14	1.39	2.75	85.7
CRUT	CHROMIUM,UNFIL.T.TOTAL	mg/kg	0	694.92	791.36	2	2	100.0	50	50	100.0	741.56	333.06	1.10	3.59	100.0
CUUT	COPPER,UNFIL.T.TOTAL	mg/kg	0	581.40	581.40	1	1	100.0	45	45	100.0	581.40	732.24	0.00	2.16	100.0
HGUT	MERCURY,UNFIL.T.TOTAL	mg/kg	0	1.90	3.23	2	2	100.0	50	49	98.0	2.48	3.24	1.46	2.04	97.1
NIUT	NICKEL,UNFIL.T.TOTAL	mg/kg	0	94.58	132.43	2	2	100.0	45	42	93.3	111.91	72.93	1.27	2.95	90.0
PBUT	LEAD,UNFIL.T.TOTAL	mg/kg	0	271.19	306.85	2	2	100.0	50	49	98.0	288.47	196.62	1.09	2.46	97.1
SBUT	SELENIUM,UNFIL.T.TOTAL	mg/kg	0	0.10	0.68	2	2	100.0	50	48	96.0	0.26	2.67	3.96	2.98	97.1
SRUT	STRONTIUM,UNFIL.T.TOTAL	mg/kg	0	91.02	122.74	2	2	100.0	50	50	100.0	105.69	240.93	1.24	2.54	100.0
ZNUT	ZINC,UNFIL.T.TOTAL	mg/kg	0	549.15	613.70	2	2	100.0	50	50	100.0	580.53	988.90	1.08	2.57	100.0
PESTICIDES,HERBICIDES,PCBS																
P1BHCB	BETA-BHC (1B-EXCHLORCYCLOHEXANE)	ug/kg	1	17.50	22.20	2	2	100.0	50	19	38.0	19.70	8.80	1.18	4.39	47.1
P1CHLA	ALPHA-CHLORDANE	ug/kg	1	8.70	11.10	2	2	100.0	50	22	44.0	9.80	6.50	1.19	2.41	55.9
P1CHLG	GAMMA-CHLORDANE	ug/kg	1	8.70	15.50	2	2	100.0	50	21	42.0	11.60	6.80	1.50	2.58	52.9
P1DIEL	DIELDRIN	ug/kg	2	9.10	12.00	2	2	100.0	50	15	30.0	10.40	6.50	1.22	3.51	38.2
P1DMDT	METHOXYCHLOR	ug/kg	1	57.30	107.40	2	2	100.0	50	15	30.0	78.40	34.10	1.56	4.42	38.2
P1HEPT	HEPTACHLOR	ug/kg	3	6.80	10.60	2	2	100.0	50	9	18.0	8.50	4.70	1.37	2.20	23.5
P1PPDE	PP-DDE	ug/kg	1	15.50	32.90	2	2	100.0	50	34	68.0	22.60	11.10	1.70	2.72	73.5
P1BHCG	GAMMA-BHC(1E-EXCHLORCYCLOHEXANE)	ug/kg	2	14.70	14.70	2	1	50.0	50	12	24.0	7.10	5.70	2.82	3.13	35.3
P1ENDS	ENDOSULFAN SULPHATE	ug/kg	3	138.60	138.60	2	1	50.0	50	6	12.0	42.30	17.50	5.36	2.53	17.7
P1HEPE	HEPTACHLOR-EPOXIDE	ug/kg	2	15.00	15.00	2	1	50.0	50	10	20.0	7.10	5.20	2.86	2.86	23.5
P1PPDD	PP-DDD	ug/kg	1	8.10	8.10	2	1	50.0	50	7	14.0	5.20	4.60	1.85	2.47	20.6
X2124	1,2,4-TRICHLOROBENZENE	ug/kg	3	21.90	21.90	2	1	50.0	50	22	44.0	12.20	14.80	2.29	5.02	52.9
X2HCB	HEXACHLOROBENZENE	ug/kg	2	13.80	13.80	2	1	50.0	50	21	42.0	6.60	7.00	2.81	2.96	55.9
VOLATILES ORGANIC COMPOUNDS																
B2OXYL	O-XYLENE (C8H10)	ug/kg	1	284.70	284.70	2	1	50.0	50	14	28.0	135.60	523.50	2.85	4.05	32.4
X1CHLO	CHLOROFORM (CHCL3)	ug/kg	1	3876.00	3876.00	2	1	50.0	50	12	24.0	512.60	441.70	17.48	4.33	35.3

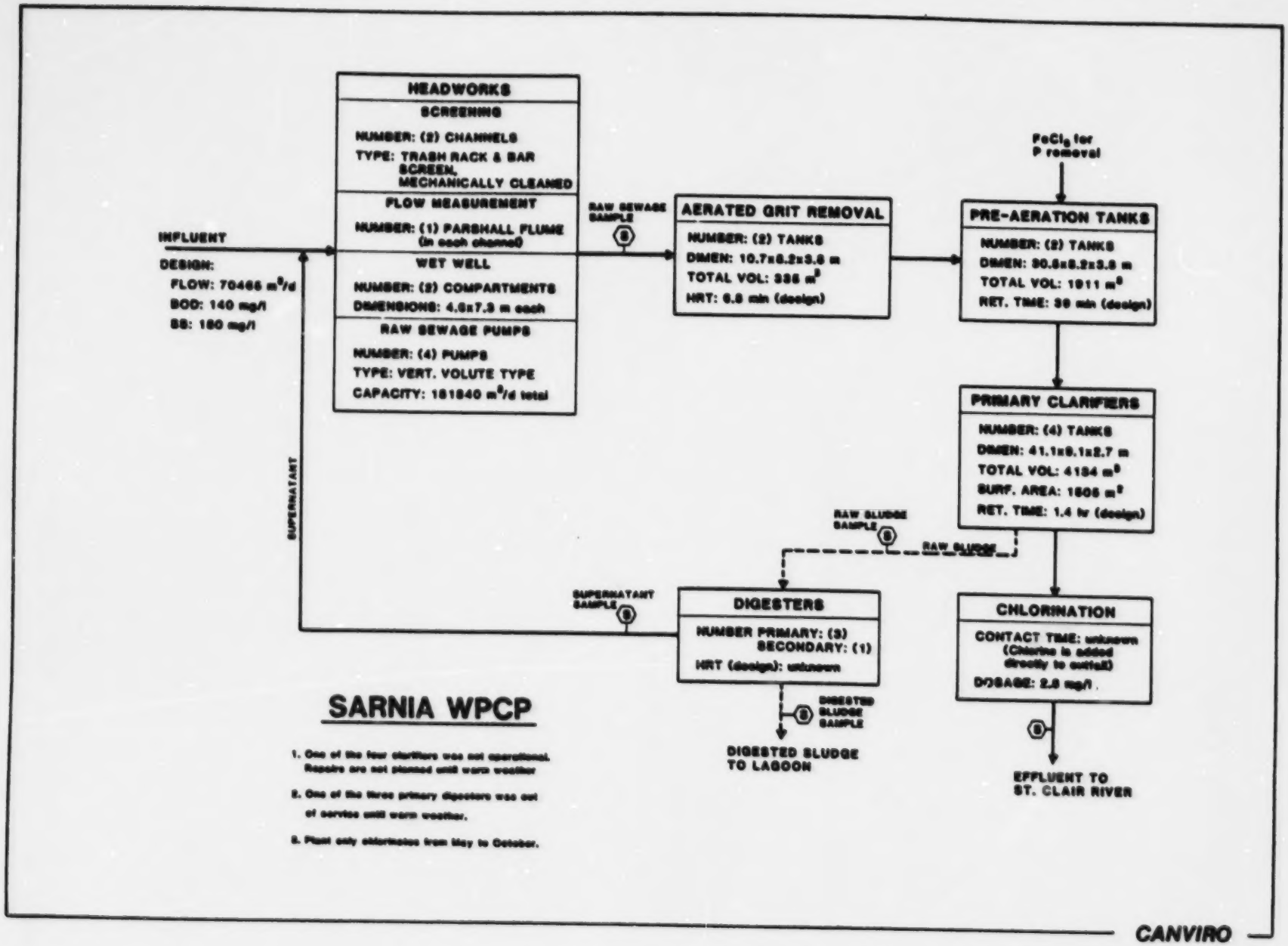
Sub-Appendix A-24

Sarnia WPCP

Contents:

- Plant Schematic with Design Characteristics
- Annual Data Review (1981 - 1986 Plant Performance)
- Sources of Municipal Water Pollution Control Plant Raw Sewage
- Operational Evaluation for Sarnia WPCP
- Analytical Data

(KIR18/28A)


HEADWORKS
SCREENING
NUMBER: (2) CHANNELS
TYPE: TRASH RACK & BAR SCREEN, MECHANICALLY CLEANED
FLOW MEASUREMENT
NUMBER: (1) PARSHALL FLUME (in each channel)
WET WELL
NUMBER: (2) COMPARTMENTS
DIMENSIONS: 4.6x7.3 m each
RAW SEWAGE PUMPS
NUMBER: (4) PUMPS
TYPE: VERT. VOLUTE TYPE
CAPACITY: 181840 m³/d total
INFLUENT
DESIGN:
FLOW: 70466 m³/d
BOD: 140 mg/l
SS: 160 mg/l
RAW SEWAGE SAMPLE
AERATED GRIT REMOVAL
NUMBER: (2) TANKS
DIMEN: 10.7x6.2x3.8 m
TOTAL VOL: 336 m³
HRT: 6.8 min (design)
FeCl3 for P removal
PRE-AERATION TANKS
NUMBER: (2) TANKS
DIMEN: 30.6x6.2x3.8 m
TOTAL VOL: 1911 m³
RET. TIME: 39 min (design)
PRIMARY CLARIFIERS
NUMBER: (4) TANKS
DIMEN: 41.1x9.1x2.7 m
TOTAL VOL: 4134 m³
SURF. AREA: 1505 m²
RET. TIME: 1.4 hr (design)
RAW SLUDGE SAMPLE
RAW SLUDGE
SUPERNATANT
SUPERNATANT SAMPLE
DIGESTERS
NUMBER PRIMARY: (3)
SECONDARY: (1)
HRT (design): unknown
DIGESTED SLUDGE SAMPLE
DIGESTED SLUDGE TO LAGOON
CHLORINATION
CONTACT TIME: unknown (Chlorine is added directly to outfall)
DOSAGE: 2.8 mg/l
EFFLUENT TO ST. CLAIR RIVER
SARNIA WPCP
1. One of the four clarifiers was out operational. Repairs are not planned until warm weather
2. One of the three primary digesters was out of service until warm weather.
3. Plant only chlorinates from May to October.
CANVIRO

SARNIA WPCP
Primary
Phosphorus Removal - Continuous
Capacity - 65.917 10(3)m3/day

PARAMETER	1981	1982	1983	1984	1985	MEAN ANNUAL AVERAGE
Avg. Daily Flow (1000 m3/day)	47.77	47.73	52.32	55.20	54.41	51.49
BOD5 - Influent (mg/L)	90.00	93.00	125.00	117.10	119.00	107.76
BOD5 - Effluent (mg/L)	41.00	37.00	43.00	44.70	42.55	41.53
Annual BOD5 Significantly Different from Mean Annual Average BOD5?	I.D.	I.D.	I.D.	I.D.	I.D.	
TSS - Influent (mg/L)	142.00	150.00	147.00	161.50	190.00	156.42
TSS - Effluent (mg/L)	20.00	21.00	18.00	18.75	24.92	20.53
Annual TSS Significantly Different from Mean Annual Average TSS?	I.D.	I.D.	I.D.	I.D.	I.D.	
Total P - Influent (mg/L)	5.37	6.27	5.70	5.34	5.05	5.57
Total P - Effluent (mg/L)	1.00	1.00	0.80	0.70	0.82	0.90
Annual TP Significantly Different from Mean Annual Average TP?	I.D.	I.D.	I.D.	I.D.	I.D.	
TP in Compliance?	Y	Y	Y	Y	Y	Y

I.D. - Insufficient Data

R

SOURCES OF MUNICIPAL WATER POLLUTION CONTROL PLANT RAW SEWAGE

GENERAL DESCRIPTION OF WATER POLLUTION CONTROL PLANT (WPCP)

NAME OF WPCP	SARNIA WPCP
WORKS NUMBER	120000907
TREATMENT TYPE	PRIMARY PHOSPHORUS REMOVAL CONTINUOUS
DESIGN CAPACITY (1000 m3/d)	65.917
1986 AVERAGE DAY FLOW (1000 m3/d)	57.880
POPULATION SERVED	64475

% OF TOTAL FLOW ATTRIBUTED TO:

INDUSTRIAL SOURCES (%)	7
COMMERCIAL SOURCES (%) (Population x 0.0757)	8
RESIDENTIAL SOURCES (%) (Population x 0.175)	19
UNACCOUNTED FOR, INCL. INFILTRATION (100-% Contributed from industrial, commercial and residential sources)	65

PROFILE OF INDUSTRIES IN CATCHMENT

TOTAL NO OF INDUSTRIES	123
INDUSTRIES WITH WATER	9
NO OF SIC CATEGORIES	31

DESCRIPTION OF THE TOP 5 INDUSTRIES DISCHARGED TO THE WPCP
(BASED ON WATER USE DATA)

DESCRIPTION	SIC	# OF COMPANIES
INORGANIC CHEMICALS MFG	2810-2818	2
PLASTICS, RESINS & SYNTHETIC FIBERS	2812-2824	3
STONE, CLAY AND MINERAL PRODUCTS	3200-3299	2
CARBON BLACK	2895-2895	3
PESTICIDES FORMULATION	2879-2879	1

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OPERATIONAL EVALUATION FOR: S A R N I A W P C P

TREATMENT FACILITY: Primary
PERIOD ENDING: Feb. 6, 1987
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: 70,465 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
RAW SEWAGE FLOW	49,472	49,057	48,698	49,435	49,046	48,621	48,690
% of Design Flow	70.21%	69.62%	69.11%	70.16%	69.60%	69.00%	69.10%
Influent BOD (mg/L)		185.0					
Primary BOD (mg/L)							
Secondary BOD (mg/L)		78.0					
% PRIMARY REMOVAL							
% SECONDARY REMOVAL		57.8					
Influent SS (mg/L)	118.0	203.0	129.0	186.0	138.0	186.0	172.0
Primary SS (mg/L)							
Secondary SS (mg/L)	25.0	49.0	16.0	12.0	45.0	43.0	19.0
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	78.8	75.9	87.6	93.5	67.4	76.9	89.0
Influent NH4 (mg/L)					37.0		
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)					38.0		
% PRIMARY REMOVAL							
% SECONDARY REMOVAL					-2.7		
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)	5.40	4.80	6.20	8.10	6.80	8.60	8.20
Primary Total P (mg/L)							
Secondary Total P (mg/L)	0.93	0.75	0.60	0.68	1.40	1.58	1.10
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	82.8	84.4	90.3	91.6	79.4	81.6	86.6

OPERATIONAL EVALUATION FOR: S A R N I A W P C P

TREATMENT FACILITY: Primary
PERIOD ENDING: Feb. 6, 1987
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: 70,465 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 8	DAY 9	DAY 10	DAY 11	DAY 12	DAY 13	DAY 14
RAW SEWAGE FLOW	50,946	48,424	48,518	49,971	50,646	49,766	52,194
% of Design Flow	72.30%	68.72%	68.85%	70.92%	71.87%	70.63%	74.07%
Influent BOD (mg/L)		132.0		213.0			
Primary BOD (mg/L)							
Secondary BOD (mg/L)		57.0		109.0			
% PRIMARY REMOVAL							
% SECONDARY REMOVAL		56.8		48.8			
Influent SS (mg/L)	66.0	200.0	182.0	254.0	142.0	135.0	182.0
Primary SS (mg/L)							
Secondary SS (mg/L)	22.0	44.0	35.0	22.0	66.0	27.0	31.0
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	66.7	78.0	80.8	91.3	53.5	80.0	83.0
Influent NH4 (mg/L)	33.0						
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)	32.0						
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	3.0						
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)	5.70	5.60	3.80	7.40	7.00	6.40	6.60
Primary Total P (mg/L)							
Secondary Total P (mg/L)	0.15	0.70	0.45	0.75	0.93	0.85	1.43
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	97.4	87.5	88.2	89.9	86.7	86.7	78.3

OPERATIONAL EVALUATION FOR: S A R N I A W P C P

TREATMENT FACILITY: Primary
PERIOD ENDING: Feb. 6, 1987
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: 70,465 m3/d

PARAMETER	SAMPLING PERIOD DAY 15	DAY 16	DAY 17	DAY 18	DAY 19	DAY 20	DAY 21
RAW SEWAGE FLOW	54,152	54,667	52,835	51,328	54,008		
% of Design Flow	76.85%	77.58%	74.98%	72.84%	76.65%		
Influent BOD (mg/L)					138.0		
Primary BOD (mg/L)							
Secondary BOD (mg/L)					62.0		
% PRIMARY REMOVAL							
% SECONDARY REMOVAL					55.1		
Influent SS (mg/L)	248.0	190.0	260.0	191.0	175.0		
Primary SS (mg/L)							
Secondary SS (mg/L)	20.0	30.0	26.0	34.0	30.0		
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	91.9	84.2	90.0	82.2	82.9		
Influent NH4 (mg/L)			42.0				
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)			32.2				
% PRIMARY REMOVAL							
% SECONDARY REMOVAL			23.3				
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)		6.30	8.20	4.60	4.80		
Primary Total P (mg/L)							
Secondary Total P (mg/L)		0.85	1.35	0.55	0.90		
% PRIMARY REMOVAL							
% SECONDARY REMOVAL		86.5	83.5	88.0	81.3		

PLANT NAME : Sarnia
PLANT TYPE : Primary

SAMPLING TYPE : Raw Sewage
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	PLANT MIN. CONC. > 4DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0	53.70	175.00	5	5	100.0	267	266	99.6	85.15	140.23	1.59	1.93	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0	158.00	356.00	5	5	100.0	260	258	99.2	226.71	287.75	1.38	1.82	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0	11.00	19.80	5	5	100.0	271	271	100.0	15.78	22.39	1.24	1.81	100.0
NNHTFR	AMMONIUM,TOTAL FILT.REAC.	mg/L	0	17.40	25.10	5	5	100.0	275	274	99.6	18.98	15.37	1.12	1.69	100.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0	22.30	32.30	5	5	100.0	273	273	100.0	26.71	25.44	1.15	1.47	100.0
PH	(-LOG(H+(CONCN))		0	6.65	7.23	5	5	100.0	275	275	100.0	6.93	6.90	1.03	1.05	100.0
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/L	0	4.48	11.40	6	6	100.0	248	248	100.0	6.11	5.18	1.44	1.51	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0	98.80	280.00	5	5	100.0	267	266	99.6	159.56	126.88	1.49	1.93	100.0
METALS																
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	820.00	2600.00	6	6	100.0	322	306	95.0	1300.00	1000.10	1.60	2.65	97.3
CUUT	COPPER,UNFILT.TOTAL	ug/L	0	110.00	110.00	1	1	100.0	49	48	98.0	110.00	110.60	0.00	2.28	97.1
PBUT	LEAD,UNFILT.TOTAL	ug/L	0	810.00	1400.00	6	6	100.0	322	57	17.7	1110.00	59.50	1.22	1.86	51.4
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	180.00	240.00	6	6	100.0	319	318	99.7	200.00	370.70	1.10	2.14	100.0
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	2640.00	4800.00	6	6	100.0	322	315	97.8	3820.00	211.00	1.28	2.94	100.0
AGUT	SILVER,UNFILT.TOTAL	ug/L	0	20.00	70.00	6	5	83.3	321	82	25.6	20.00	10.40	2.38	2.55	75.7
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	0.20	0.72	6	5	83.3	283	274	96.8	0.55	0.23	1.78	2.11	100.0
CDUT	CADMIUM,UNFILT.TOTAL	ug/L	0	10.00	20.00	6	4	66.7	322	76	23.6	20.00	6.50	2.19	2.09	70.3
COUT	COBALT,UNFILT.TOTAL	ug/L	0	20.00	50.00	6	3	50.0	322	82	25.5	20.00	9.30	2.99	2.31	83.8
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	30.00	50.00	6	3	50.0	322	237	73.6	30.00	51.10	1.96	3.44	89.2
MOUT	MOLYBDENUM,UNFILT.TOTAL	ug/L	0	20.00	30.00	6	2	33.3	321	41	12.8	20.00	12.40	1.67	1.72	56.8
PESTICIDES,HERBICIDES,PCBS																
P1PCBT	PCB, TOTAL	ug/L	2	0.16	3.30	5	4	80.0	276	42	15.2	0.38	0.06	5.21	2.31	46.0
P324D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	0.04	0.92	5	3	60.0	276	214	77.5	0.07	0.13	5.15	3.72	100.0
P324ST	2,4,5-TRICLORPHENOXYACETIC ACID	ug/L	3	0.15	0.15	5	1	20.0	276	22	8.0	0.06	0.06	1.63	1.60	37.8
X2HCB	HEXACHLOROBENZENE	ug/L	2	0.03	0.03	5	1	20.0	276	11	4.0	0.01	0.01	1.63	1.39	18.9

PLANT NAME : Sarnia
PLANT TYPE : Primary

SAMPLING TYPE : Final Effluent
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	STD. FOR SURFACE WATER	STD. REF.	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET.	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																		
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0		-	15.20	26.00	5	5	100.0	40	40	100.0	19.80	48.40	1.25	2.05	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0		-	56.00	126.00	5	5	100.0	40	40	100.0	86.01	108.54	1.36	1.56	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0		-	8.80	13.30	5	5	100.0	40	40	100.0	10.93	12.80	1.17	1.40	100.0
NNHTFR	AMMONIUM,TOTAL FILT.REAC.	mg/L	0		-	17.60	21.60	5	5	100.0	40	40	100.0	18.97	10.46	1.08	1.66	100.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0		-	20.30	24.10	5	5	100.0	40	40	100.0	22.34	15.36	1.09	1.30	100.0
PH	(-LOG(H+(CONC#))		0		-	6.85	7.44	5	5	100.0	40	40	100.0	7.02	6.88	1.03	1.03	100.0
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/L	0		-	0.66	1.23	6	6	100.0	34	34	100.0	0.88	1.34	1.24	1.96	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0		-	19.30	25.50	5	5	100.0	39	39	100.0	22.33	29.57	1.13	1.73	100.0
METALS																		
CUUT	COPPER,UNFILT.TOTAL	ug/L	0	5.00	ONT-MOE	20.00	20.00	1	1	100.0	8	7	87.5	20.00	18.20	0.00	1.85	100.0
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	30.00	ONT-MOE	670.00	1300.00	6	6	100.0	48	48	100.0	880.00	69.80	1.32	3.04	100.0
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	75.00	ONT-MOE	120.00	410.00	6	5	83.3	48	46	95.8	200.00	550.00	1.56	3.45	100.0
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	0.20	ONT-MOE	0.04	0.10	6	5	83.3	39	38	97.4	0.10	0.05	2.40	2.42	100.0
PBUT	LEAD,UNFILT.TOTAL	ug/L	0	25.00	ONT-MOE	70.00	140.00	6	5	83.3	48	9	18.8	90.00	20.80	1.29	1.94	71.4
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	3750.00	ONT-MOE	150.00	180.00	6	5	83.3	48	47	97.9	90.00	304.90	4.16	2.83	100.0
COUT	COBALT,UNFILT.TOTAL	ug/L	0	5.00	NYS-STD	10.00	10.00	6	1	16.7	48	11	22.9	10.00	6.50	1.90	1.58	85.7
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	100.00	ONT-MOE	10.00	10.00	6	1	16.7	48	29	60.4	10.00	10.80	1.98	1.94	85.7
NIUT	NICKEL,UNFILT.TOTAL	ug/L	0	25.00	ONT-MOE	10.00	10.00	6	1	16.7	48	10	20.8	10.00	8.70	3.72	2.86	57.1
DIOXINS AND FURANS																		
P94CDF	TETRACHLORODIBENZOFURAN	ng/L	2	0.03	ONT-MOE	0.10	0.10	1	1	100.0	8	1	12.5	0.10	0.09	0.00	2.20	14.3
PESTICIDES,HERBICIDES,PCBS																		
P1PCBT	PCB, TOTAL	ug/L	2	0.00	ONT-MOE	0.05	0.45	5	5	100.0	40	7	17.5	0.18	0.03	2.30	3.06	28.6
P524D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	4.00	ONT-MOE	0.02	0.22	5	4	80.0	40	27	67.5	0.04	0.06	3.54	4.96	85.7
P1BHCG	GAMMA-BHC(HEXCHLORCYCLHEXANE)	ug/L	2	0.06	ONT-MOE	0.02	0.04	5	3	60.0	40	29	72.5	0.01	0.02	2.69	2.28	85.7
P524T	2,4,5-TRICLORPHENOXYACETIC ACID	ug/L	3		-	0.07	0.07	5	1	20.0	40	7	17.5	0.03	0.04	1.58	2.61	42.9
VOLATILES ORGANIC COMPOUNDS																		
B2OXYL	O-XYLENE	ug/L	1	100.00	ONT-MOE	2.80	5.60	3	3	100.0	38	13	34.2	3.69	1.94	1.44	3.05	85.7
X1TETR	TETRACHLOROETHYLENE	ug/L	1	0.70	NYS-GUL	4.10	12.00	3	3	100.0	38	21	55.3	6.55	4.39	1.73	5.84	85.7
B1OCTE	1-OCTENE	ug/L	1		-	10.00	10.00	3	1	33.3	38	1	2.6	2.82	1.58	2.99	1.36	14.3
B2MPXY	M-, AND P-XYLENES	ug/L	1	50.00	NYS-GUL	3.70	3.70	3	1	33.3	38	10	26.3	1.55	1.83	2.13	3.42	85.7
X1111T	1,1,1-TRICHLOROETHANE	ug/L	1	50.00	NYS-GUL	3.70	3.70	3	1	33.3	38	10	26.3	1.55	2.34	2.13	5.17	28.6
X1CHLO	CHLOROFORM	ug/L	1	0.20	NYS-STD	2.20	2.20	3	1	33.3	38	15	39.5	1.30	2.07	1.58	2.72	71.4

PLANT NAME : Sarnia
PLANT TYPE : Primary

SAMPLING TYPE : Recycle
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
COD	CHEMICAL OXYGEN DEMAND	mg/L	0	12430.00	22000.00	4	4	100.0	39	39	100.0	16070.17	3439.26	1.33	4.55	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0	88.20	178.00	4	4	100.0	42	42	100.0	124.57	77.62	1.45	3.54	100.0
NNHTFR	AMMONIUM,TOTAL FILT.REAC.	mg/L	0	340.00	357.00	4	4	100.0	44	44	100.0	350.68	146.20	1.02	2.07	100.0
NNO2FR	NITRITE,FILT. REACT.	mg/L	0	0.16	0.25	4	4	100.0	42	36	85.7	0.21	0.05	1.21	3.13	100.0
NNTFR	NITRATES,TOTAL FILT.REAC.	mg/L	0	1.05	1.15	4	4	100.0	44	39	88.6	1.11	0.41	1.04	2.66	100.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0	825.00	975.00	4	4	100.0	42	42	100.0	872.93	324.28	1.08	1.95	100.0
PH	(-LOG(H+(CONC))		0	6.94	7.03	4	4	100.0	44	44	100.0	6.98	6.94	1.01	1.05	100.0
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/L	0	638.88	1120.00	5	5	100.0	43	43	100.0	838.74	53.83	1.23	4.47	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0	17800.00	28700.00	4	4	100.0	42	42	100.0	20794.37	2242.77	1.25	3.60	100.0
METALS																
AGUT	SILVER,UNFILT.TOTAL	ug/L	0	800.00	2500.00	4	4	100.0	53	42	79.3	1460.00	72.30	1.83	4.09	100.0
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	172280.00	250000.00	4	4	100.0	53	53	100.0	218370.00	28798.20	1.18	4.42	100.0
CAUT	CALCIUM,UNFILT.TOTAL	ug/L	0	700920.00	1265000.00	5	5	100.0	54	54	100.0	1014420.00	208447.60	1.28	1.87	100.0
CDUT	CADMIUM,UNFILT.TOTAL	ug/L	0	970.00	1390.00	4	4	100.0	53	37	69.8	1160.00	58.40	1.16	6.63	77.8
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	2500.00	3500.00	4	4	100.0	53	51	96.2	2910.00	874.70	1.15	6.11	100.0
CUUT	COPPER,UNFILT.TOTAL	ug/L	0	16880.00	20000.00	2	2	100.0	12	12	100.0	18370.00	1814.00	1.13	5.64	100.0
FEUT	IRON,UNFILT.TOTAL	ug/L	0	2519400.00	4730000.00	4	4	100.0	53	53	100.0	3419990.00	109963.30	1.35	4.19	100.0
MGUT	MAGNESIUM,UNFILT.TOTAL	ug/L	0	147320.00	244000.00	5	5	100.0	54	54	100.0	205760.00	41620.20	1.23	1.78	100.0
PBUT	LEAD,UNFILT.TOTAL	ug/L	0	82000.00	107000.00	4	4	100.0	53	36	67.9	93190.00	429.50	1.12	6.62	100.0
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	4320.00	5580.00	4	4	100.0	53	53	100.0	5030.00	1347.00	1.11	2.13	100.0
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	220000.00	368000.00	4	4	100.0	53	53	100.0	287170.00	3112.40	1.24	7.41	100.0
ASUT	ARSENIC,UNFILT.TOTAL	ug/L	0	270.00	580.00	5	4	80.0	51	27	52.9	330.00	37.50	1.29	2.92	66.7
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	16.00	40.00	5	4	80.0	47	44	93.6	14.16	1.68	4.58	4.49	100.0
SEUT	SELENIUM,UNFILT.TOTAL	ug/L	0	100.00	150.00	5	4	80.0	51	25	49.0	190.00	44.20	2.58	3.52	55.6
COUT	COBALT,UNFILT.TOTAL	ug/L	0	3280.00	3600.00	4	2	50.0	53	21	39.6	740.00	23.60	7.47	4.63	88.9
BEUT	BERYLLIUM,UNFILT.TOTAL	ug/L	0	20.00	20.00	4	1	25.0	53	2	3.8	20.00	5.90	2.17	1.65	22.2
CCNFUR	CYANIDE-FREE,UNFILT.REAC.	ug/L	0	10.00	10.00	4	1	25.0	43	17	39.5	0.00	4.00	2.52	5.19	66.7
NIUT	NICKEL,UNFILT.TOTAL	ug/L	0	570.00	570.00	4	1	25.0	53	41	77.4	1180.00	308.60	1.62	3.08	88.9
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PNFLAN	FLUORANTHENE	ug/L	1	237.60	258.00	3	3	100.0	43	3	7.0	247.49	80.62	1.04	2.54	11.1
PNPHEN	PHENANTHRENE	ug/L	1	341.60	363.80	3	3	100.0	43	3	7.0	355.98	82.69	1.04	2.63	11.1
P2AMET	AMETRYNE	ug/L	1	2200.00	2200.00	3	1	33.3	43	1	2.3	516.14	199.01	3.51	2.60	11.1
P4MCRE	M-CRESOL	ug/L	1	405.00	405.00	3	1	33.3	43	27	62.8	208.87	562.69	1.77	5.63	88.9
DIOXINS AND FURANS																
P4CDF	TETRACHLORODIBENZOFURAN	ng/L	2	153.00	153.00	1	1	100.0	11	1	9.1	153.00	0.43	0.00	8.08	11.1
P8CDD	OCTACHLORODIBENZODIOXIN	ng/L	1	30.00	30.00	1	1	100.0	11	3	27.3	30.00	1.87	0.00	4.46	33.3
PESTICIDES,HERBICIDES,PCBS																
P1PCBT	PCB, TOTAL	ug/L	2	16.00	29.00	4	4	100.0	44	27	61.4	22.68	0.77	1.29	7.58	77.8
P1ALDR	ALDRIN	ug/L	1	0.40	1.50	4	3	75.0	44	6	13.6	0.42	0.06	3.04	3.46	33.3
P1HEPT	HEPTACHLOR	ug/L	3	0.60	2.40	4	3	75.0	44	9	20.5	0.64	0.07	3.92	3.83	44.4

PLANT NAME : Sarnia — **SAMPLING TYPE : Recycle**
PLANT TYPE : Primary — **SAMPLE FORM : Wet Weight**

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	PLANT MIN. CONC. > «DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
PESTICIDES,HERBICIDES,PCBS																
P1PPDE	PP-DDE	ug/L	1	0.40	1.10	4	3	75.0	44	17	38.6	0.42	0.07	2.83	3.59	55.6
P1245T	2,4,5-TRICLORPHENOXYACETIC ACID	ug/L	3	0.34	1.10	4	3	75.0	44	18	40.9	0.65	0.43	1.75	4.50	77.8
P1SILV	SILVEX	ug/L	3	0.36	1.20	4	3	75.0	44	15	34.1	0.70	0.38	1.81	5.08	66.7
X2HCB	HEXACHLOROBENZENE	ug/L	2	2.10	3.20	4	3	75.0	44	12	27.3	1.17	0.07	5.21	4.31	66.7
P1CHLA	ALPHA-CHLORDANE	ug/L	1	0.30	0.40	4	2	50.0	44	11	25.0	0.19	0.06	2.07	2.96	55.6
P1OCHL	OXYCHLORDANE	ug/L	2	0.30	0.30	4	2	50.0	44	4	9.1	0.17	0.05	1.89	2.96	22.2
P24D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	8.33	13.00	4	2	50.0	44	29	65.9	1.44	0.79	9.86	5.21	88.9
X2124	1,2,4-TRICHLOROBENZENE	ug/L	3	0.60	0.80	4	2	50.0	44	15	34.1	0.26	0.11	3.08	4.17	44.4
P1BHCB	BETA-BHC (HEXCHLORCYCLHEXANE)	ug/L	1	0.30	0.30	4	1	25.0	44	10	22.7	0.13	0.08	1.73	2.84	55.6
P1CHLG	GAMMA-CHLORDANE	ug/L	1	0.30	0.30	4	1	25.0	44	11	25.0	0.13	0.06	1.73	2.70	44.4
P1DIEL	DIELDRIN	ug/L	2	0.50	0.50	4	1	25.0	44	7	15.9	0.15	0.06	2.24	2.81	55.6
P1DMDT	METHOXYCHLOR	ug/L	1	2.00	2.00	4	1	25.0	44	7	15.9	0.71	0.32	2.00	2.82	44.4
P1END1	ENDOSULFAN I	ug/L	3	0.60	0.60	4	1	25.0	44	3	6.8	0.16	0.06	2.45	3.33	33.3
P1ENDR	ENDRIN	ug/L	3	0.30	0.30	4	1	25.0	44	3	6.8	0.13	0.06	1.73	3.22	22.2
P1HEPE	HEPTACHLOREPOXIDE	ug/L	2	0.20	0.20	4	1	25.0	44	3	6.8	0.12	0.06	1.41	3.11	33.3
P1MIRX	MIREX	ug/L	1	0.40	0.40	4	1	25.0	44	3	6.8	0.14	0.05	2.00	3.00	22.2
P1PPDD	PP-DDD	ug/L	1	0.20	0.20	4	1	25.0	44	10	22.7	0.12	0.05	1.41	2.86	66.7

PLANT NAME : Sarnia
PLANT TYPE : Primary

SAMPLING TYPE : Raw Sludge
SAMPLE FORM : Dry Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS (DRY WEIGHT)	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
COD	CHEMICAL OXYGEN DEMAND	mg/kg	0	1062749.00	1062749.00	1	1	100.0	45	45	100.0	1062749.00	892221.45	0.00	3.19	100.0
NNHTFR	AMMONIUM,TOTAL FILT.REAC.	mg/kg	0	3665.34	3665.34	1	1	100.0	48	47	97.9	3665.34	5911.32	0.00	4.59	100.0
NNOTFR	NITRATES,TOTAL FILT.REAC.	mg/kg	0	43.82	43.82	1	1	100.0	48	43	89.6	43.82	25.44	0.00	2.21	93.9
NNTKUR	NITROGEN-TOT-KJEL.,UNF.TOT	mg/kg	0	20916.33	20916.33	1	1	100.0	51	51	100.0	20916.33	36897.85	0.00	2.98	100.0
PH	(-LOG(H+(CONCN))	mg/kg	0	7.32	7.32	1	1	100.0	49	49	100.0	7.32	6.03	0.00	1.10	100.0
PHENOL	PHENOLICS (4AAP)	mg/kg	0	278.88	278.88	1	1	100.0	50	41	82.0	278.88	82.34	0.00	3.54	85.3
PPUT	PHOSPHORUS,UNFILT.TOTAL.	mg/kg	0	27689.24	27689.24	1	1	100.0	42	42	100.0	27689.24	20347.70	0.00	4.43	100.0
RST	RESIDUE, TOTAL.	mg/kg	0	50200.00	50200.00	1	1	100.0	51	51	100.0	50200.00	32783.51	0.00	1.81	100.0
RSTLOI	RESIDUE,TOT.LOSS ON IGNI.	mg/kg	0	24800.00	24800.00	1	1	100.0	51	51	100.0	24800.00	20803.05	0.00	1.77	100.0
METALS																
AGUT	SILVER,UNFILT.TOTAL.	mg/kg	0	34.66	34.66	1	1	100.0	45	40	88.9	34.66	30.17	0.00	2.61	84.4
ALUT	ALUMINUM,UNFILT.TOTAL.	mg/kg	0	6573.71	6573.71	1	1	100.0	51	51	100.0	6573.71	9835.74	0.00	2.51	100.0
ASUT	ARSENIC,UNFILT.TOTAL.	mg/kg	0	9.76	9.76	1	1	100.0	51	50	98.0	9.76	6.13	0.00	2.01	97.1
CDUT	CADMIUM,UNFILT.TOTAL.	mg/kg	0	65.74	65.74	1	1	100.0	43	40	93.0	65.74	9.74	0.00	4.35	90.0
CRUT	CHROMIUM,UNFILT.TOTAL.	mg/kg	0	105.58	105.58	1	1	100.0	51	50	98.0	105.58	301.43	0.00	3.68	97.1
CUUT	COPPER,UNFILT.TOTAL.	mg/kg	0	741.24	741.24	1	1	100.0	46	46	100.0	741.24	606.31	0.00	1.72	100.0
HGUT	MERCURY,UNFILT.TOTAL.	mg/kg	0	3.78	3.78	1	1	100.0	50	50	100.0	3.78	2.23	0.00	1.67	100.0
PBUT	LEAD,UNFILT.TOTAL.	mg/kg	0	5179.28	5179.28	1	1	100.0	49	48	98.0	5179.28	173.99	0.00	2.24	98.9
SEUT	SELENIUM,UNFILT.TOTAL.	mg/kg	0	3.59	3.59	1	1	100.0	50	48	96.0	3.59	3.04	0.00	1.93	93.9
SRUT	STRONTIUM,UNFILT.TOTAL.	mg/kg	0	169.32	169.32	1	1	100.0	51	51	100.0	169.32	231.70	0.00	1.97	100.0
ZNUT	ZINC,UNFILT.TOTAL.	mg/kg	0	16334.66	16334.66	1	1	100.0	51	51	100.0	16334.66	905.39	0.00	2.39	100.0
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PMMCRE	M-CRESOL	ug/kg	1	113545.80	113545.80	1	1	100.0	51	42	82.3	113545.80	116847.30	0.00	12.16	85.3
PNACNY	ACENAPHTHYLENE	ug/kg	1	13187.30	13187.30	1	1	100.0	51	1	2.0	13187.30	4406.70	0.00	1.83	2.9
PNFLAN	FLUORANTHENE	ug/kg	1	8350.60	8350.60	1	1	100.0	51	2	3.9	8350.60	3083.50	0.00	1.97	5.9
PNPHEN	PHENANTHRENE	ug/kg	1	11513.90	11513.90	1	1	100.0	51	6	11.8	11513.90	3563.50	0.00	2.19	17.7
PNPYR	PYRENE	ug/kg	1	8039.80	8039.80	1	1	100.0	51	2	3.9	8039.80	4522.60	0.00	1.87	5.9
PESTICIDES,HERBICIDES,PCBS																
P1ALDR	ALDRIN	ug/kg	1	49.80	49.80	1	1	100.0	51	6	11.8	49.80	4.60	0.00	2.50	17.7
P1BHCA	ALPHA-BHC(HEXCHLORCYCLOHEXANE)	ug/kg	1	4.00	4.00	1	1	100.0	51	12	23.5	4.00	5.50	0.00	2.74	35.3
P1BHCB	BETA-BHC (HEXCHLORCYCLOHEXANE)	ug/kg	1	10.00	10.00	1	1	100.0	51	18	35.3	10.00	7.40	0.00	3.29	38.2
P1CHLA	ALPHA-CHLORDANE	ug/kg	1	12.00	12.00	1	1	100.0	51	18	35.3	12.00	5.90	0.00	2.30	47.1
P1CHLG	GAMMA-CHLORDANE	ug/kg	1	8.00	8.00	1	1	100.0	51	19	37.3	8.00	6.00	0.00	2.44	50.0
P1DIEL	DIELDRIN	ug/kg	2	31.90	31.90	1	1	100.0	51	20	39.2	31.90	7.20	0.00	3.10	50.0
P1END2	ENDOSULFAN II	ug/kg	3	6.00	6.00	1	1	100.0	51	6	11.8	6.00	4.20	0.00	2.38	17.7
P1ENDR	ENDRIN	ug/kg	3	10.00	10.00	1	1	100.0	51	8	15.7	10.00	4.20	0.00	2.21	23.5
P1HEPT	HEPTACHLOR	ug/kg	3	91.60	91.60	1	1	100.0	51	7	13.7	91.60	4.50	0.00	2.83	20.6
P1MIRX	MIREX	ug/kg	1	23.90	23.90	1	1	100.0	51	2	3.9	23.90	4.00	0.00	2.37	5.9
P1OCHL	OXYCHLORDANE	ug/kg	2	10.00	10.00	1	1	100.0	51	8	15.7	10.00	4.50	0.00	2.27	20.6
P1PCBT	PCB, TOTAL	ug/kg	2	2191.20	2191.20	1	1	100.0	51	40	78.4	2191.20	88.70	0.00	3.18	79.4
P1PPDD	PP-DDD	ug/kg	1	4.00	4.00	1	1	100.0	51	13	25.5	4.00	5.10	0.00	2.48	35.3
P1PPDE	PP-DDE	ug/kg	1	67.70	67.70	1	1	100.0	51	22	43.1	67.70	7.50	0.00	2.31	52.9
P1PPDT	PP-DDT	ug/kg	3	15.90	15.90	1	1	100.0	51	6	11.8	15.90	16.40	0.00	2.27	17.7
P245T	2,4,5-TRICLORPHENOXYACETIC ACID	ug/kg	3	69.70	69.70	1	1	100.0	51	21	41.2	69.70	48.90	0.00	3.49	47.1

PLANT NAME : Sarnia
PLANT TYPE : Primary

SAMPLING TYPE : Raw Sludge
SAMPLE FORM : Dry Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS (DRY WEIGHT)	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
P24D	2,4-DICHLOROPHENOXYACETIC ACID	ug/g	3	53.80	53.80	1	1	100.0	51	38	74.5	53.80	93.20	0.00	6.50	82.3
P5SILV	SILVEX	ug/g	3	41.80	41.80	1	1	100.0	51	23	45.1	41.80	47.30	0.00	3.40	55.9
X2124	1,2,4-TRICHLOROBENZENE	ug/g	3	37.80	37.80	1	1	100.0	51	17	33.3	37.80	9.30	0.00	4.06	41.2
X2HCB	HEXACHLOROBENZENE	ug/g	2	145.40	145.40	1	1	100.0	51	17	33.3	145.40	5.60	0.00	2.65	38.2

PLANT NAME : Sarnia
PLANT TYPE : Primary

SAMPLING TYPE : Treated Sludge
SAMPLE FORM : Dry Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
COD	CHEMICAL OXYGEN DEMAND	mg/kg	0	727563.03	727563.03	1	1	100.0	36	36	100.0	727563.03	508097.94	0.00	4.65	100.0
NNHTPR	AMMONIUM,TOTAL FILT.REAC.	mg/kg	0	3697.48	3697.48	1	1	100.0	25	25	100.0	3697.48	17658.28	0.00	2.93	100.0
NNOTPR	NITRATES,TOTAL FILT.REAC.	mg/kg	0	9.24	9.24	1	1	100.0	26	23	88.5	9.24	42.68	0.00	2.29	95.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/kg	0	22268.91	22268.91	1	1	100.0	49	49	100.0	22268.91	38494.12	0.00	1.77	100.0
PH	(-1.00)(H+(CONC?))	mg/kg	0	6.93	6.93	1	1	100.0	47	47	100.0	6.93	7.17	0.00	1.09	100.0
PHNOL	PHENOLICS (4AAP)	mg/kg	0	22.69	22.69	1	1	100.0	49	41	83.7	22.69	43.05	0.00	3.14	87.9
PPUT	PHOSPHORUS,UNFIL.T.TOTAL	mg/kg	0	34369.75	34369.75	1	1	100.0	43	43	100.0	34369.75	76638.67	0.00	6.91	100.0
RST	RESIDUE, TOTAL	mg/kg	0	119000.00	119000.00	1	1	100.0	50	50	100.0	119000.00	80434.04	0.00	3.23	100.0
RSTLOI	RESIDUE,TOT.LOSS ON IGNI.	mg/kg	0	44200.00	44200.00	1	1	100.0	50	50	100.0	44200.00	43379.33	0.00	3.19	100.0
METALS																
AGUT	SILVER,UNFIL.T.TOTAL	mg/kg	0	60.25	60.25	1	1	100.0	44	44	100.0	60.25	37.78	0.00	2.33	100.0
ALUT	ALUMINUM,UNFIL.T.TOTAL	mg/kg	0	10924.37	10924.37	1	1	100.0	50	50	100.0	10924.37	10715.94	0.00	2.82	100.0
ASUT	ARSENIC,UNFIL.T.TOTAL	mg/kg	0	13.28	13.28	1	1	100.0	50	49	98.0	13.28	5.40	0.00	2.08	97.1
CDUT	CADMIUM,UNFIL.T.TOTAL	mg/kg	0	50.42	50.42	1	1	100.0	45	41	91.1	50.42	10.47	0.00	3.98	90.3
CRUT	CHROMIUM,UNFIL.T.TOTAL	mg/kg	0	134.45	134.45	1	1	100.0	50	50	100.0	134.45	333.06	0.00	3.59	100.0
CUUT	COPPER,UNFIL.T.TOTAL	mg/kg	0	921.85	921.85	1	1	100.0	45	45	100.0	921.85	732.34	0.00	2.16	100.0
HGUT	MERCURY,UNFIL.T.TOTAL	mg/kg	0	2.94	2.94	1	1	100.0	50	49	98.0	2.94	3.24	0.00	2.04	97.1
PBUT	LEAD,UNFIL.T.TOTAL	mg/kg	0	4537.82	4537.82	1	1	100.0	50	49	98.0	4537.82	198.62	0.00	2.46	97.1
SEUT	SELENIUM,UNFIL.T.TOTAL	mg/kg	0	2.52	2.52	1	1	100.0	50	48	96.0	2.52	2.67	0.00	2.98	97.1
SRUT	STRONTIUM,UNFIL.T.TOTAL	mg/kg	0	176.47	176.47	1	1	100.0	50	50	100.0	176.47	240.93	0.00	2.54	100.0
ZNUT	ZINC,UNFIL.T.TOTAL	mg/kg	0	15126.05	15126.05	1	1	100.0	50	50	100.0	15126.05	988.90	0.00	2.57	100.0
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PMBBP	BUTYLBENZYLPHTHALATE	ug/kg	1	2563.00	2563.00	1	1	100.0	50	8	16.0	2563.00	1916.90	0.00	5.23	17.7
PNACNY	ACENAPHTHYLENE	ug/kg	1	6142.90	6142.90	1	1	100.0	50	1	2.0	6142.90	1909.40	0.00	3.26	2.9
PNFLAN	FLUORANTHENE	ug/kg	1	9243.70	9243.70	1	1	100.0	50	4	8.0	9243.70	1338.90	0.00	4.26	8.8
PNFLUO	FLUORENE	ug/kg	1	2601.70	2601.70	1	1	100.0	50	3	6.0	2601.70	1352.10	0.00	3.25	8.8
PNPHEN	PHENANTHRENE	ug/kg	1	12605.00	12605.00	1	1	100.0	50	12	24.0	12605.00	2220.50	0.00	4.27	26.5
PNPYR	PYRENE	ug/kg	1	9243.70	9243.70	1	1	100.0	50	3	6.0	9243.70	2124.30	0.00	3.44	8.8
PESTICIDES,HERBICIDES,PCBS																
P1ALDR	ALDRIN	ug/kg	1	25.20	25.20	1	1	100.0	50	11	22.0	25.20	5.30	0.00	2.67	26.5
P1BHCB	BETA-BHC (HEXACHLORCYCLOHEXANE)	ug/kg	1	5.00	5.00	1	1	100.0	50	19	38.0	5.00	8.80	0.00	4.39	47.1
P1BHCD	DELTA-BHC(HEXACHLORCYCLOHEXANE)	ug/kg	1	2.50	2.50	1	1	100.0	50	4	8.0	2.50	3.90	0.00	1.93	11.8
P1BHCG	GAMMA-BHC(HEXACHLORCYCLOHEXANE)	ug/kg	2	5.00	5.00	1	1	100.0	50	12	24.0	5.00	5.70	0.00	3.13	35.3
P1CHLA	ALPHA-CHLORDANE	ug/kg	1	9.20	9.20	1	1	100.0	50	22	44.0	9.20	6.50	0.00	2.41	55.9
P1CHLG	GAMMA-CHLORDANE	ug/kg	1	6.70	6.70	1	1	100.0	50	21	42.0	6.70	6.80	0.00	2.58	52.9
P1HEPT	HEPTACHLOR	ug/kg	3	18.50	18.50	1	1	100.0	50	9	18.0	18.50	4.70	0.00	2.20	23.5
P1MIRX	MIREX	ug/kg	1	10.10	10.10	1	1	100.0	50	8	16.0	10.10	4.90	0.00	2.52	17.7
P1PCBT	PCB, TOTAL	ug/kg	2	1008.40	1008.40	1	1	100.0	50	32	64.0	1008.40	114.10	0.00	4.58	67.7
P1PPDR	PP-DDR	ug/kg	1	29.40	29.40	1	1	100.0	50	34	68.0	29.40	11.10	0.00	2.72	73.5
P245T	2,4,5-TRICHLORPHENOXYACETIC ACID	ug/kg	3	59.70	59.70	1	1	100.0	50	16	32.0	59.70	84.40	0.00	3.13	41.2
P24D	2,4-DICHLOROPHENOXYACETIC ACID	ug/kg	3	62.20	62.20	1	1	100.0	50	25	50.0	62.20	75.00	0.00	5.81	64.7
P5HLV	SILVEX	ug/kg	3	16.80	16.80	1	1	100.0	50	18	36.0	16.80	92.70	0.00	2.94	44.1
X2124	1,2,4-TRICHLOROBENZENE	ug/kg	3	23.50	23.50	1	1	100.0	50	22	44.0	23.50	14.80	0.00	5.02	52.9
X2HCB	HEXACHLOROBENZENE	ug/kg	2	76.50	76.50	1	1	100.0	50	21	42.0	76.50	7.00	0.00	2.96	55.9

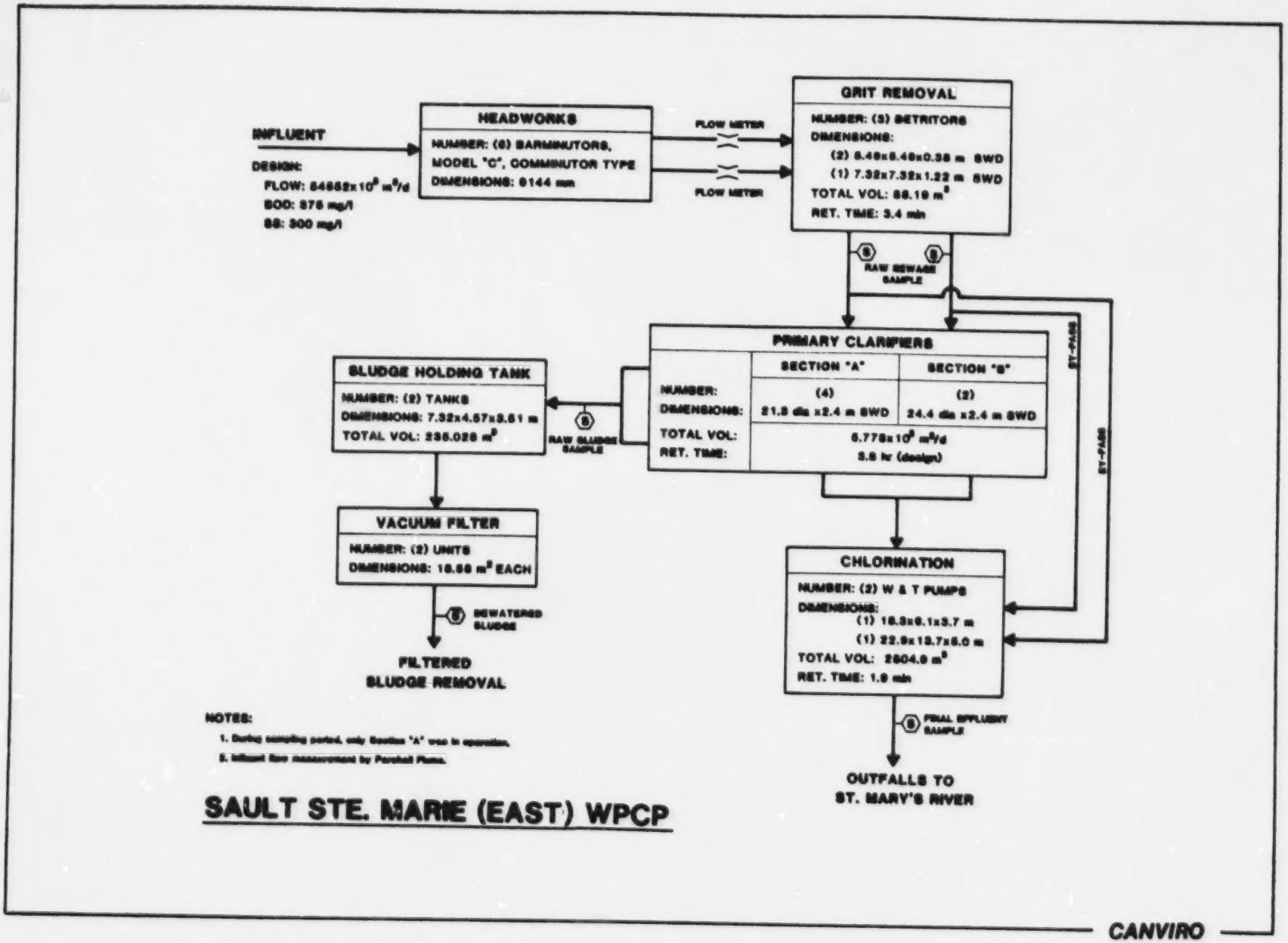
Sub-Appendix A-25

Sault Ste. Marie (East) WPCP

Contents:

- Plant Schematic with Design Characteristics
- Annual Data Review (1981 - 1986 Plant Performance)
- Sources of Municipal STP Raw Sewage
- Operational Evaluation for Sault Ste. Marie (East)- WPCP
- Analytical Data

(KIR18/28A)


INFLUENT
DESIGN:
FLOW: 64662x10³ m³/d
BOD: 375 mg/l
SS: 300 mg/l
HEADWORKS
NUMBER: (6) BARMINUTORS,
MODEL "C", COMMINUTOR TYPE
DIMENSIONS: 6144 mm
FLOW METER
FLOW METER
GRIT REMOVAL
NUMBER: (3) DETRITORS
DIMENSIONS:
(2) 6.49x6.49x0.38 m SWD
(1) 7.32x7.32x1.22 m SWD
TOTAL VOL: 66.19 m³
RET. TIME: 3.4 min
RAW SEWAGE SAMPLE
PRIMARY CLARIFIERS
SECTION "A"
SECTION "B"
NUMBER: (4) (2)
DIMENSIONS: 21.3 dia x2.4 m SWD 24.4 dia x2.4 m SWD
TOTAL VOL: 6.778x10³ m³/d
RET. TIME: 3.8 hr (design)
BY-PASS
BY-PASS
SLUDGE HOLDING TANK
NUMBER: (2) TANKS
DIMENSIONS: 7.32x4.57x3.61 m
TOTAL VOL: 235.028 m³
RAW SLUDGE SAMPLE
VACUUM FILTER
NUMBER: (2) UNITS
DIMENSIONS: 18.58 m² EACH
DEWATERED SLUDGE
FILTERED
SLUDGE REMOVAL
CHLORINATION
NUMBER: (2) W & T PUMPS
DIMENSIONS:
(1) 18.3x6.1x3.7 m
(1) 22.9x13.7x5.0 m
TOTAL VOL: 2604.9 m³
RET. TIME: 1.9 min
FINAL EFFLUENT SAMPLE
OUTFALLS TO
ST. MARY'S RIVER
NOTES:
1. During sampling period, only Section "A" was in operation.
2. Influent flow measurement by Parshall Flume.
SAULT STE. MARIE (EAST) WPCP
CANVIRO

SAULT STE. MARIE WPCP
Primary
Capacity - 54.552 10(3)m3/day

PARAMETER	1981	1982	1983	1984	1985	5 YEAR AVERAGE 1981 - 85
Avg. Daily Flow (1000 m3/day)	48.28	51.10	46.93	45.90	50.28	48.50
BOD5 - Influent (mg/L)	135.67	130.44	149.83	158.00	137.50	142.30
BOD5 - Effluent (mg/L)	70.40	70.50	74.64	83.14	83.23	76.40
Annual BOD5 Significantly Different from Mean Annual Average BOD5?	N	N	N	N	N	
TSS - Influent (mg/L)	155.13	150.82	145.85	165.42	160.92	157.23
TSS - Effluent (mg/L)	53.90	54.71	53.70	61.70	59.96	56.84
Annual TSS Significantly Different from Mean Annual Average TSS?	N	N	N	N	N	
Total P - Influent (mg/L)	5.13	4.60	6.26	6.24	5.00	5.47
Total P - Effluent (mg/L)	3.15	3.00	4.10	4.61	4.23	3.86
Annual TP Significantly Different from Mean						
Annual Average TP?	N	N	N	N	N	
TP in Compliance?	N	N	N	N	N	N

I.D. - Insufficient Data

R

SOURCES OF MUNICIPAL WATER POLLUTION CONTROL PLANT RAW SEWAGE

GENERAL DESCRIPTION OF WATER POLLUTION CONTROL PLANT (WPCP)

NAME OF WPCP	SAULT STE. MARIE WPCP
WORKS NUMBER	110000640
TREATMENT TYPE	PRIMARY
DESIGN CAPACITY (1000 m3/d)	54.552
1986 AVERAGE DAY FLOW (1000 m3/d)	41.755
POPULATION SERVED	75000

% OF TOTAL FLOW ATTRIBUTED TO:

INDUSTRIAL SOURCES (%)	26
COMMERCIAL SOURCES (%) (Population x 0.0757)	14
RESIDENTIAL SOURCES (%) (Population x 0.175)	31
UNACCOUNTED FOR, INCL. INFILTRATION (100-% Contributed from industrial, commercial and residential sources)	29

PROFILE OF INDUSTRIES IN CATCHMENT

TOTAL NO OF INDUSTRIES	137
INDUSTRIES WITH WATER	31
NO OF SIC CATEGORIES	30

DESCRIPTION OF THE TOP 5 INDUSTRIES DISCHARGED TO THE WPCP (BASED ON WATER USE DATA)

DESCRIPTION	SIC	# OF COMPANIES
METAL FINISHING	3411-3469	11
PULP,PAPER,PAPERBOARD	2600-2631	1
BEVERAGES	2082-2087	2
TIMBER PRODUCTS	2411-2499	13
IRON AND STEEL	3300-3317	1

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OPERATIONAL EVALUATION FOR: S A U L T S T E . M A R I E E A S T W P C P

TREATMENT FACILITY: Primary
PERIOD ENDING: March 22,1987
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: 54,552 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
RAW SEWAGE FLOW	24,600	23,900	23,100	29,400	33,600	50,300	43,800
% of Design Flow	45.09%	43.81%	42.34%	53.89%	61.59%	92.21%	80.29%
Influent BOD (mg/L)			179				
Primary BOD (mg/L)			62				
Secondary BOD (mg/L)							
% PRIMARY REMOVAL			65.2				
% SECONDARY REMOVAL							
Influent SS (mg/L)			220				
Primary SS (mg/L)			38				
Secondary SS (mg/L)							
% PRIMARY REMOVAL			82.7				
% SECONDARY REMOVAL							
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)			5.4				
Primary Total P (mg/L)			3.7				
Secondary Total P (mg/L)							
% PRIMARY REMOVAL			32.0				
% SECONDARY REMOVAL							

OPERATIONAL EVALUATION FOR: SAULT STE. MARIE EAST (OLD)

TREATMENT FACILITY: Primary
PERIOD ENDING: March 22,1987
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: 54,552 m3/d

PARAMETER	PRE-SAMPLING PERIOD						
	DAY 8	DAY 9	DAY 10	DAY 11	DAY 12	DAY 13	DAY 14
RAW SEWAGE FLOW	31,700	29,800	27,300	27,400	26,000	26,400	28,300
% of Design Flow	58.11%	54.63%	50.04%	50.23%	47.66%	48.39%	51.88%
Influent BOD (mg/L)				182			
Primary BOD (mg/L)				72			
Secondary BOD (mg/L)							
% PRIMARY REMOVAL				60.5			
% SECONDARY REMOVAL							
Influent SS (mg/L)				148			
Primary SS (mg/L)				40			
Secondary SS (mg/L)							
% PRIMARY REMOVAL				73.0			
% SECONDARY REMOVAL							
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)				4.9			
Primary Total P (mg/L)				3.3			
Secondary Total P (mg/L)							
% PRIMARY REMOVAL				32.7			
% SECONDARY REMOVAL							

OPERATIONAL EVALUATION FOR: SAULT STE. MARIE EAST (OLD)

TREATMENT FACILITY: Primary
PERIOD ENDING: March 22,1987
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: 54,552 m3/d

PARAMETER	SAMPLING PERIOD DAY 15	DAY 16	DAY 17	DAY 18	DAY 19	DAY 20	DAY 21
RAW SEWAGE FLOW	29,500	32,500	32,500	35,200	35,000	36,600	39,300
% of Design Flow	54.08%	59.58%	59.58%	64.53%	64.16%	67.09%	72.04%
Influent BOD (mg/L)			134				
Primary BOD (mg/L)			46				
Secondary BOD (mg/L)							
% PRIMARY REMOVAL			65.9				
% SECONDARY REMOVAL							
Influent SS (mg/L)			116				
Primary SS (mg/L)			27				
Secondary SS (mg/L)							
% PRIMARY REMOVAL			76.7				
% SECONDARY REMOVAL							
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)			4.1				
Primary Total P (mg/L)			0.0				
Secondary Total P (mg/L)							
% PRIMARY REMOVAL			100.0				
% SECONDARY REMOVAL							

PLANT NAME : Sault St. Marie (East)
PLANT TYPE : Primary

SAMPLING TYPE : Raw Sewage
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	PLANT MIN. CONC. > ? IDL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0	75.20	133.00	5	5	100.0	267	266	99.6	101.16	140.23	1.29	1.93	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0	104.00	222.00	5	5	100.0	260	258	99.2	142.87	287.75	1.32	1.82	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0	16.00	56.80	5	5	100.0	271	271	100.0	29.92	22.39	1.80	1.81	100.0
NNHTFR	AMMONIUM,TOTAL FILT.REAC.	mg/L	0	12.00	14.70	5	5	100.0	275	274	99.6	13.29	15.37	1.08	1.69	100.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0	17.50	21.00	5	5	100.0	273	273	100.0	19.38	25.44	1.07	1.47	100.0
PH	(-LOG(H+(CONCN))		0	6.57	6.81	5	5	100.0	275	275	100.0	6.72	6.90	1.01	1.05	100.0
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/L	0	3.33	4.09	6	6	100.0	248	248	100.0	3.71	5.18	1.08	1.51	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0	54.00	138.00	5	5	100.0	267	266	99.6	68.38	126.88	1.49	1.93	100.0
METALS																
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	240.00	790.00	6	6	100.0	322	306	95.0	530.00	1000.10	1.55	2.65	97.3
CUUT	COPPER,UNFILT.TOTAL	ug/L	0	50.00	50.00	1	1	100.0	49	48	98.0	50.00	110.60	0.00	2.28	97.1
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	0.13	0.41	5	5	100.0	283	274	96.8	0.18	0.23	1.61	2.11	100.0
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	160.00	190.00	6	6	100.0	319	318	99.7	170.00	370.70	1.07	2.14	100.0
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	130.00	240.00	6	6	100.0	322	315	97.8	170.00	211.00	1.23	2.94	100.0
COUT	COBALT,UNFILT.TOTAL	ug/L	0	10.00	10.00	6	2	33.3	322	82	25.5	10.00	9.30	1.46	2.31	83.8
AGUT	SILVER,UNFILT.TOTAL	ug/L	0	20.00	20.00	6	1	16.7	321	82	25.6	10.00	10.40	2.71	2.55	75.7
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PMMCRE	M-CRESOL	ug/L	1	37.70	160.00	5	5	100.0	275	167	60.7	71.31	25.59	1.72	3.45	86.5
PMPHEN	PHENOL	ug/L	2	37.90	57.60	5	2	40.0	275	118	42.9	15.59	14.52	2.75	2.46	78.4
PM26DT	2,6-DINITROTOLUENE	ug/L	1	36.90	36.90	5	1	20.0	275	1	0.4	10.31	7.54	2.06	1.28	2.7
PMB2EM	BIS(2-CHLORETHOXY)METHANE	ug/L	1	47.70	47.70	5	1	20.0	275	2	0.7	7.85	5.09	2.74	1.38	5.4
PMB2NE	BIS-(2-CHLOROMETHYL)ETHER	ug/L	2	39.40	39.40	5	1	20.0	275	2	0.7	10.45	7.81	2.10	1.34	5.4
PMBBP	BUTYLBENZYLPHTHALATE	ug/L	1	14.60	14.60	5	1	20.0	275	34	12.4	6.20	5.85	1.61	1.66	37.8
PMNNP	N-NITROSO-DI-NPROPYLAMINE	ug/L	1	39.00	39.00	5	1	20.0	275	2	0.7	7.54	5.09	2.51	1.37	5.4
PNBAA	BENZO(A)ANTHRACENE	ug/L	1	37.60	37.60	5	1	20.0	275	1	0.4	7.49	5.03	2.47	1.29	2.7
PNBKF	BENZO(K)FLUORANTHENE	ug/L	1	33.30	33.30	5	1	20.0	275	1	0.4	7.31	5.03	2.33	1.29	2.7
PNFLAN	FLUORANTHENE	ug/L	1	36.60	36.60	5	1	20.0	275	4	1.5	7.45	5.09	2.44	1.29	5.4
PNNAPH	NAPHTHALENE	ug/L	1	15.40	15.40	5	1	20.0	275	16	5.8	6.26	5.37	1.65	1.47	21.6
PNPHEN	PHENANTHRENE	ug/L	1	39.30	39.30	5	1	20.0	275	7	2.6	7.55	5.17	2.51	1.35	10.8
X3PCPH	PENTACHLOROPHENOL	ug/L	1	110.20	110.20	5	1	20.0	275	5	1.8	19.32	12.94	2.65	1.42	10.8
PESTICIDES,HERBICIDES,PCBS																
P1BHCG	GAMMA-BHC(HEXCHLORCYCLOHEXANE)	ug/L	2	0.03	0.05	5	3	60.0	276	143	51.8	0.02	0.02	2.11	2.29	94.6
P1DMDT	METHOXYCHLOR	ug/L	1	1.80	1.90	5	3	60.0	276	47	17.0	0.43	0.08	7.19	3.14	43.2
P1BHCA	ALPHA-BHC(HEXCHLORCYCLOHEXANE)	ug/L	1	0.06	0.06	5	2	40.0	276	16	5.8	0.02	0.01	2.67	1.50	18.9
P1END2	ENDOSULFAN II	ug/L	3	0.05	0.09	5	2	40.0	276	10	3.6	0.02	0.01	2.90	1.42	21.6
P24D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	0.10	0.25	5	2	40.0	276	214	77.5	0.05	0.13	3.25	3.72	100.0
P1MEX	MIREX	ug/L	1	0.04	0.04	5	1	20.0	276	6	2.2	0.01	0.01	1.86	1.28	10.8

PLANT NAME :Sault St. Marie (East)
PLANT TYPE :Primary

SAMPLING TYPE : Final Effluent
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	STD. FOR SURFACE WATER	STD. REF.	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET.	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																		
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0		-	61.40	98.80	5	5	100.0	40	40	100.0	79.35	48.40	1.26	2.05	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0		-	86.70	146.00	5	5	100.0	40	40	100.0	106.35	108.54	1.24	1.56	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0		-	13.00	44.80	5	5	100.0	40	40	100.0	18.27	12.80	1.67	1.40	100.0
NH4TPR	AMMONIUM,TOTAL FIL.T.REAC.	mg/L	0		-	10.90	13.70	5	5	100.0	40	40	100.0	12.27	10.46	1.10	1.66	100.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0		-	16.50	20.30	5	5	100.0	40	40	100.0	17.87	15.36	1.08	1.30	100.0
PH	(-LOG(H+(CONC#))		0		-	6.70	6.84	5	5	100.0	40	40	100.0	6.79	6.88	1.01	1.03	100.0
PPUT	PHOSPHORUS,UNFIL.T.TOTAL	mg/L	0		-	3.00	4.02	6	6	100.0	34	34	100.0	3.38	1.34	1.11	1.96	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0		-	34.00	39.50	5	5	100.0	39	39	100.0	36.80	29.57	1.07	1.73	100.0
PHNOL	PHENOLICS (4AAP)	mg/L	0	0.00	ONT-MOE	0.11	0.14	5	2	40.0	40	7	17.5	0.07	0.06	1.66	2.01	57.1
METALS																		
ALUT	ALUMINUM,UNFIL.T.TOTAL	ug/L	0	75.00	ONT-MOE	470.00	650.00	6	6	100.0	48	46	95.8	550.00	550.00	1.12	3.45	100.0
CUUT	COPPER,UNFIL.T.TOTAL	ug/L	0	5.00	ONT-MOE	10.00	10.00	1	1	100.0	8	7	87.5	10.00	18.20	0.00	1.85	100.0
HGUT	MERCURY,UNFIL.T.TOTAL	ug/L	0	0.20	ONT-MOE	0.08	0.11	5	5	100.0	39	38	97.4	0.10	0.05	1.13	2.42	100.0
SRUT	STRONTIUM,UNFIL.T.TOTAL	ug/L	0	3750.00	ONT-MOE	170.00	210.00	6	6	100.0	48	47	97.9	180.00	304.90	1.09	2.83	100.0
ZNUT	ZINC,UNFIL.T.TOTAL	ug/L	0	30.00	ONT-MOE	90.00	130.00	6	6	100.0	48	48	100.0	120.00	69.80	1.16	3.04	100.0
CDUT	CADMIUM,UNFIL.T.TOTAL	ug/L	0	0.20	ONT-MOE	0.00	0.00	6	3	50.0	49	18	37.5	0.00	2.50	1.64	1.96	85.7
CCNFUR	CYANIDE-FREE,UNFIL.T.REAC.	ug/L	0	5.00	ONT-MOE	10.00	10.00	5	1	20.0	40	3	7.5	0.00	0.90	2.23	2.61	42.9
AGUT	SILVER,UNFIL.T.TOTAL	ug/L	0	0.10	ONT-MOE	10.00	10.00	6	1	16.7	48	8	16.7	10.00	6.40	1.94	1.61	57.1
MOUT	MOLYBDENUM,UNFIL.T.TOTAL	ug/L	0		-	10.00	10.00	6	1	16.7	48	11	22.9	10.00	6.60	1.33	1.66	71.4
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																		
PMBBP	BUTYLBENZYLPHTHALATE	ug/L	1	50.00	NYS-GUL	4.40	9.20	5	5	100.0	39	8	20.5	6.87	1.42	1.42	2.10	57.1
PMMCRE	M-CRESOL	ug/L	1		-	7.80	15.20	5	3	60.0	39	18	46.2	4.98	3.90	3.07	2.97	71.4
PMPHEN	PHENOL	ug/L	2	1.00	ONT-MOE	7.90	8.70	5	2	40.0	39	5	12.8	2.97	1.78	2.55	1.60	42.9
PNNAPH	NAPHTHALENE	ug/L	1	10.00	NYS-STD	4.60	4.60	5	1	20.0	39	5	12.8	1.36	1.15	1.98	1.42	42.9
PESTICIDES,HERBICIDES,PCBS																		
P1BHC0	GAMMA-BHC(HEXCHLORCYCLHEXANE)	ug/L	2	0.06	ONT-MOE	0.02	0.09	5	5	100.0	40	29	72.5	0.04	0.02	1.91	2.28	85.7
P1DMDT	METHOXYCHLOR	ug/L	1	0.04	ONT-MOE	1.00	1.30	5	3	60.0	40	4	10.0	0.25	0.04	8.30	3.12	28.6
P1BHCA	ALPHA-BHC(HEXCHLORCYCLHEXANE)	ug/L	1	0.00	NYS-GUL	0.05	0.05	5	2	40.0	40	2	5.0	0.01	0.01	3.11	1.58	14.3
P1BHCB	BETA-BHC (HEXCHLORCYCLHEXANE)	ug/L	1	0.01	ONT-MOE	0.01	0.02	5	2	40.0	40	6	15.0	0.01	0.01	1.86	1.36	28.6
P24D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	4.00	ONT-MOE	0.06	0.09	5	2	40.0	40	27	67.5	0.02	0.06	3.01	4.96	85.7
P1END1	ENDOSULFAN II	ug/L	3	0.00	ONT-MOE	0.01	0.01	5	1	20.0	40	1	2.5	0.01	0.01	1.36	1.12	14.3
VOLATILES ORGANIC COMPOUNDS																		
X1CHLO	CHLOROFORM	ug/L	1	0.20	NYS-STD	3.10	4.60	5	3	60.0	38	15	39.5	2.23	2.07	2.11	2.72	71.4
B2EBNZ	ETHYLBENZENE	ug/L	1	70.00	ONT-MOE	2.20	2.20	5	1	20.0	38	5	13.2	1.17	1.29	1.42	2.05	28.6
B2MPXY	M-, AND P-XYLENES	ug/L	1	50.00	NYS-GUL	3.30	3.30	5	1	20.0	38	10	26.3	1.27	1.83	1.71	3.42	85.7
B3OXYL	O-XYLENE	ug/L	1	100.00	ONT-MOE	4.10	4.10	5	1	20.0	38	13	34.2	1.33	1.94	1.88	3.05	85.7

PLANT NAME : Sault Ste. Marie (East)
PLANT TYPE : Primary

SAMPLING TYPE : Raw Sludge
SAMPLE FORM : Dry Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS(DRY WEIGHT)	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
COD	CHEMICAL OXYGEN DEMAND	mg/kg	0	1368421.05	1368421.05	1	1	100.0	45	45	100.0	1368421.05	892221.45	0.00	3.19	100.0
NNHTYR	AMMONIUM,TOTAL PELT.REAC.	mg/kg	0	8163.74	8163.74	1	1	100.0	48	47	97.9	8163.74	5911.32	0.00	4.59	100.0
NNTKUR	NITROGEN-TOT-KJEL,UNP.TOT	mg/kg	0	36608.19	36608.19	1	1	100.0	51	51	100.0	36608.19	36897.85	0.00	2.98	100.0
PH	(-LOG(H+(CONC?))	mg/kg	0	5.20	5.20	1	1	100.0	49	49	100.0	5.20	6.03	0.00	1.10	100.0
PHENOL	PHENOLICS (4AAP)	mg/kg	0	233.92	233.92	1	1	100.0	50	41	82.0	233.92	82.34	0.00	3.54	85.3
PPUT	PHOSPHORUS,UNFIL.T.TOTAL.	mg/kg	0	10385.96	10385.96	1	1	100.0	42	42	100.0	10385.96	20347.70	0.00	4.43	100.0
RST	RESIDUE, TOTAL.	mg/kg	0	8550.00	8550.00	1	1	100.0	51	51	100.0	8550.00	32783.51	0.00	1.81	100.0
RSTLOI	RESIDUE,TOT.LOSS ON IGNI.	mg/kg	0	6580.00	6580.00	1	1	100.0	51	51	100.0	6580.00	20803.05	0.00	1.77	100.0
METALS																
ALUT	ALUMINUM,UNFIL.T.TOTAL.	mg/kg	0	4762.57	4762.57	1	1	100.0	51	51	100.0	4762.57	9835.74	0.00	2.51	100.0
ASUT	ARSENIC,UNFIL.T.TOTAL.	mg/kg	0	3.51	3.51	1	1	100.0	51	50	98.0	3.51	6.13	0.00	2.01	97.1
CDUT	CADMIUM,UNFIL.T.TOTAL.	mg/kg	0	5.38	5.38	1	1	100.0	43	40	93.0	5.38	9.74	0.00	4.35	90.0
CRUT	CHROMIUM,UNFIL.T.TOTAL.	mg/kg	0	63.16	63.16	1	1	100.0	51	50	98.0	63.16	301.43	0.00	3.68	97.1
CUUT	COPPER,UNFIL.T.TOTAL.	mg/kg	0	321.64	321.64	1	1	100.0	46	46	100.0	321.64	606.31	0.00	1.72	100.0
HGUT	MERCURY,UNFIL.T.TOTAL.	mg/kg	0	2.34	2.34	1	1	100.0	50	50	100.0	2.34	2.23	0.00	1.67	100.0
PBUT	LEAD,UNFIL.T.TOTAL.	mg/kg	0	143.86	143.86	1	1	100.0	49	48	98.0	143.86	173.99	0.00	2.24	98.9
SRUT	STRONTIUM,UNFIL.T.TOTAL.	mg/kg	0	114.62	114.62	1	1	100.0	51	51	100.0	114.62	231.70	0.00	1.97	100.0
ZNUT	ZINC,UNFIL.T.TOTAL.	mg/kg	0	500.58	500.58	1	1	100.0	51	51	100.0	500.58	905.39	0.00	2.39	100.0
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PMBBP	BUTYLBENZYLPHTHALATE	ug/kg	1	48701.80	48701.80	1	1	100.0	51	4	7.8	48701.80	3445.60	0.00	2.25	11.8
PMMCRE	M-CRESOL	ug/kg	1	549707.60	549707.60	1	1	100.0	51	42	82.3	549707.60	116847.30	0.00	12.16	85.3
PMPHEN	PHENOL	ug/kg	2	76491.20	76491.20	1	1	100.0	51	15	29.4	76491.20	7312.80	0.00	3.00	38.2
PESTICIDES,HERBICIDES,PCBS																
P1PCBT	PCB, TOTAL	ug/kg	2	128.70	128.70	1	1	100.0	51	40	78.4	128.70	88.70	0.00	3.18	79.4
P1PPDT	PP-DDT	ug/kg	3	105.30	105.30	1	1	100.0	51	6	11.8	105.30	16.40	0.00	2.27	17.7
P524D	2,4-DICHLOROPHENOXYACETIC ACID	ug/kg	3	3742.70	3742.70	1	1	100.0	51	38	74.5	3742.70	93.20	0.00	6.50	82.3
P55B.V	5B.VBX	ug/kg	3	1169.60	1169.60	1	1	100.0	51	23	45.1	1169.60	47.30	0.00	3.40	55.9
X2124	1,2,4-TRICHLOROBENZENE	ug/kg	3	35.10	35.10	1	1	100.0	51	17	33.3	35.10	9.30	0.00	4.06	41.2
VOLATILE ORGANIC COMPOUNDS																
B24PXY	M-, AND P-XYLENES	ug/kg	1	5497.10	5497.10	1	1	100.0	51	16	31.4	5497.10	1345.90	0.00	3.86	41.2

PLANT NAME : Sault Ste. Marie (East) **SAMPLING TYPE : Treated Sludge**
PLANT TYPE : Primary **SAMPLE FORM : Dry Weight**

CONTAM-INANT	CONTAMINANT NAME	UNITS (DRY WEIGHT)	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
COD	CHEMICAL OXYGEN DEMAND	mg/kg	0	2863.64	2863.64	1	1	100.0	36	36	100.0	2863.64	508097.94	0.00	4.65	100.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/kg	0	18900.01	18900.01	1	1	100.0	49	49	100.0	18900.01	38494.12	0.00	1.77	100.0
PH	(-LOG(H+(CONCN))	mg/kg	0	6.60	6.60	1	1	100.0	47	47	100.0	6.60	7.17	0.00	1.09	100.0
PHNOL	PHENOLICS (4AAP)	mg/kg	0	26.70	26.70	1	1	100.0	49	41	83.7	26.70	43.05	0.00	3.14	87.9
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/kg	0	107020.00	107020.00	1	1	100.0	43	43	100.0	107920.00	76638.67	0.00	6.91	100.0
RST	RESIDUE, TOTAL	mg/kg	0	176000.00	176000.00	1	1	100.0	50	50	100.0	176000.00	80434.04	0.00	3.23	100.0
RSTLOI	RESIDUE,TOT.LOSS ON IGNI.	mg/kg	0	146907.20	146907.20	1	1	100.0	50	50	100.0	146907.20	43379.33	0.00	3.19	100.0
METALS																
ALUT	ALUMINUM,UNFILT.TOTAL	mg/kg	0	391.42	391.42	1	1	100.0	50	50	100.0	391.42	10715.94	0.00	2.82	100.0
ASUT	ARSENIC,UNFIL.T.TOTAL	mg/kg	0	3.41	3.41	1	1	100.0	50	49	98.0	3.41	5.40	0.00	2.06	97.1
CRUT	CHROMIUM,UNFIL.T.TOTAL	mg/kg	0	5.45	5.45	1	1	100.0	50	50	100.0	5.45	333.06	0.00	3.59	100.0
CUUT	COPPER,UNFIL.T.TOTAL	mg/kg	0	58.24	58.24	1	1	100.0	45	45	100.0	58.24	732.34	0.00	2.16	100.0
HGUT	MERCURY,UNFIL.T.TOTAL	mg/kg	0	3.58	3.58	1	1	100.0	50	49	98.0	3.58	3.24	0.00	2.04	97.1
PBUT	LEAD,UNFIL.T.TOTAL	mg/kg	0	10.23	10.23	1	1	100.0	50	49	98.0	10.23	196.62	0.00	2.46	97.1
SEUT	SELENIUM,UNFIL.T.TOTAL	mg/kg	0	1.70	1.70	1	1	100.0	50	48	96.0	1.70	2.67	0.00	2.98	97.1
SRUT	STRONTIUM,UNFIL.T.TOTAL	mg/kg	0	6.25	6.25	1	1	100.0	50	50	100.0	6.25	240.93	0.00	2.54	100.0
ZNUT	ZINC,UNFIL.T.TOTAL	mg/kg	0	52.05	52.05	1	1	100.0	50	50	100.0	52.05	988.90	0.00	2.57	100.0
DIOXINS AND FURANS																
P98CDD	OCTACHLORODIBENZODIOXIN	ug/kg	1	4.50	4.50	1	1	100.0	49	26	53.1	4.50	7.10	0.00	3.84	64.7
PESTICIDES,HERBICIDES,PCBS																
P1BHCA	ALPHA-BHC(HEXACHLORCYCLOHEXANE)	ug/kg	1	62.50	62.50	1	1	100.0	50	11	22.0	62.50	5.60	0.00	3.00	32.4
P1BHCB	BETA-BHC (HEXACHLORCYCLOHEXANE)	ug/kg	1	13.70	13.70	1	1	100.0	50	19	38.0	13.70	8.80	0.00	4.39	47.1
P1BHCG	GAMMA-BHC(HEXACHLORCYCLOHEXANE)	ug/kg	2	107.40	107.40	1	1	100.0	50	12	24.0	107.40	5.70	0.00	3.13	35.3
VOLATILE ORGANIC COMPOUNDS																
B2ETBNZ	ETHYLBENZENE (C8H10)	ug/kg	1	795.50	795.50	1	1	100.0	50	14	28.0	795.50	606.50	0.00	5.59	32.4
B2MPXY	M-, AND P-XYLENES	ug/kg	1	1363.60	1363.60	1	1	100.0	50	15	30.0	1363.60	816.00	0.00	7.11	32.4
B2OXYL	O-XYLENE (C8H10)	ug/kg	1	528.40	528.40	1	1	100.0	50	14	28.0	528.40	523.50	0.00	4.05	32.4

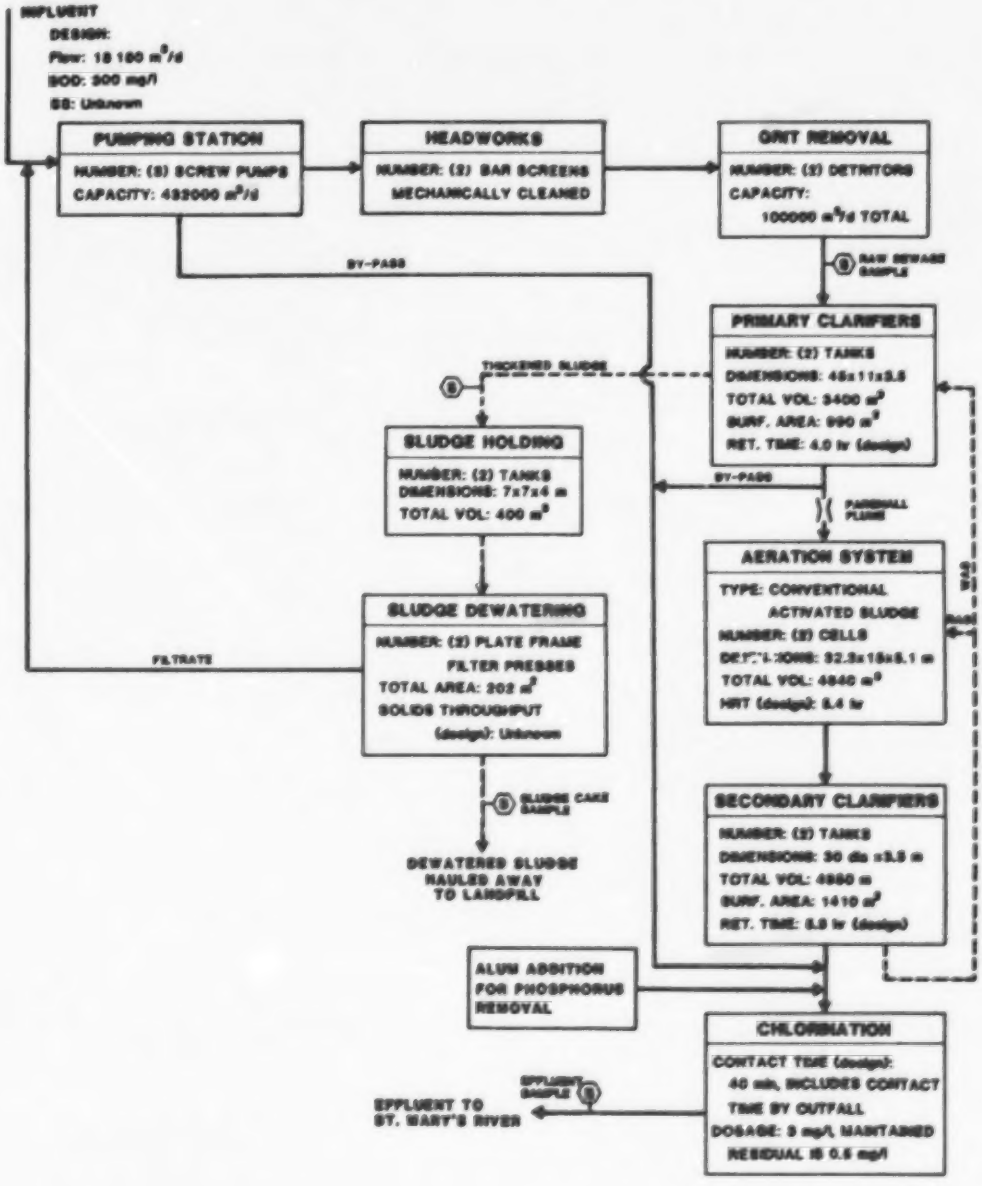
Sub-Appendix A-26

Sault Ste. Marie (West) WPCP

Contents:

- Plant Schematic with Design Characteristics
- Sources of Municipal Water Pollution Control Plant Raw Sewage
- Operational Evaluation for Sault Ste. Marie (West) WPCP
- Analytical Data

(KIR18/28A)



SAULT STE. MARIE (WEST) WPCP

CANVIRO

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SOURCES OF MUNICIPAL WATER POLLUTION CONTROL PLANT RAW SEWAGE

GENERAL DESCRIPTION OF WATER POLLUTION CONTROL PLANT (WPCP)

NAME OF WPCP	SAULT STE. MARIE WEST WPCP
WORKS NUMBER	110002540
TREATMENT TYPE	CONVENTIONAL ACTIVATED SLUDGE PHOSPHORUS REMOVAL CONTINUOUS
DESIGN CAPACITY (1000 m3/d)	18.180
1986 AVERAGE DAY FLOW (1000 m3/d)	9.106
POPULATION SERVED	17500

% OF TOTAL FLOW ATTRIBUTED TO:

INDUSTRIAL SOURCES (%)	NOT ESTIMATED
COMMERCIAL SOURCES (%) (Population x 0.0757)	15
RESIDENTIAL SOURCES (%) (Population x 0.175)	34
UNACCOUNTED FOR, INCL. INFILTRATION (100-% Contributed from industrial, commercial and residential sources)	52

PROFILE OF INDUSTRIES IN CATCHMENT

TOTAL NO OF INDUSTRIES	NOT ESTIMATED
INDUSTRIES WITH WATER	
NO OF SIC CATEGORIES	

DESCRIPTION OF THE TOP 5 INDUSTRIES DISCHARGED TO THE WPCP (BASED ON WATER USE DATA)

DESCRIPTION	SIC	# OF COMPANIES

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OPERATIONAL EVALUATION FOR: S A U L T S T E . M A R I E W E S T W P C P

TREATMENT FACILITY: Secondary
PERIOD ENDING: March 22,1987
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: 18,180 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
RAW SEWAGE FLOW	10,500	5,944	6,993	5,994	6,993	11,986	11,488
% of Design Flow	57.76%	32.70%	38.47%	32.97%	38.47%	65.93%	63.19%
Influent BOD (mg/L)			227				
Primary BOD (mg/L)							
Secondary BOD (mg/L)			14				
% PRIMARY REMOVAL							
% SECONDARY REMOVAL			93.7				
Influent SS (mg/L)			136				
Primary SS (mg/L)							
Secondary SS (mg/L)			19				
% PRIMARY REMOVAL							
% SECONDARY REMOVAL			86.3				
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)			4.2				
Primary Total P (mg/L)							
Secondary Total P (mg/L)			0.78				
% PRIMARY REMOVAL							
% SECONDARY REMOVAL			81.4				

OPERATIONAL EVALUATION FOR: SAULT STE. MARIE WEST WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: March 22,1987
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: 18,180 m3/d

PARAMETER	PRE-SAMPLING PERIOD						
	DAY 8	DAY 9	DAY 10	DAY 11	DAY 12	DAY 13	DAY 14
RAW SEWAGE FLOW	11,488	8,991	8,991	6,993	7,992	7,992	6,993
% of Design Flow	63.19%	49.46%	49.46%	38.47%	43.96%	43.96%	38.47%
Influent BOD (mg/L)			106				
Primary BOD (mg/L)							
Secondary BOD (mg/L)			21				
% PRIMARY REMOVAL							
% SECONDARY REMOVAL			80.6				
Influent SS (mg/L)			108				
Primary SS (mg/L)							
Secondary SS (mg/L)			22				
% PRIMARY REMOVAL							
% SECONDARY REMOVAL			79.8				
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)			7.2				
Primary Total P (mg/L)							
Secondary Total P (mg/L)			0.43				
% PRIMARY REMOVAL							
% SECONDARY REMOVAL			94.0				

OPERATIONAL EVALUATION FOR: SAULT STE. MARIE WEST WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: March 22,1987
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: 18,180 m3/d

PARAMETER	SAMPLING PERIOD DAY 15	DAY 16	DAY 17	DAY 18	DAY 19	DAY 20	DAY 21
RAW SEWAGE FLOW	6,993	7,992	8,991	7,992	8,991	8,991	8,991
% of Design Flow	38.47%	43.96%	49.46%	43.96%	49.46%	49.46%	49.46%
Influent BOD (mg/L)			105				
Primary BOD (mg/L)							
Secondary BOD (mg/L)			15				
% PRIMARY REMOVAL							
% SECONDARY REMOVAL			85.3				
Influent SS (mg/L)			100				
Primary SS (mg/L)							
Secondary SS (mg/L)			19				
% PRIMARY REMOVAL							
% SECONDARY REMOVAL			80.8				
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)			2.7				
Primary Total P (mg/L)							
Secondary Total P (mg/L)			0.37				
% PRIMARY REMOVAL							
% SECONDARY REMOVAL			86.5				

PLANT NAME : Sault St. Marie (West)
PLANT TYPE : Secondary

SAMPLING TYPE : Raw Sewage
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	PLANT MIN. CONC. > =DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0	11.00	127.00	5	5	100.0	267	266	99.6	59.47	140.23	2.71	1.93	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0	12.00	212.00	5	5	100.0	260	258	99.2	101.74	287.75	3.37	1.82	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0	7.30	19.00	5	5	100.0	271	271	100.0	15.23	22.39	1.51	1.81	100.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0	1.20	26.50	5	5	100.0	273	273	100.0	11.78	25.44	3.60	1.47	100.0
PH	(-LOG(H+(CONCN))		0	6.66	6.94	5	5	100.0	275	275	100.0	6.82	6.90	1.02	1.05	100.0
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/L	0	0.51	3.95	5	5	100.0	248	248	100.0	2.25	5.18	2.31	1.51	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0	6.10	89.60	5	5	100.0	267	266	99.6	42.25	126.88	3.05	1.93	100.0
NNHTPR	AMMONIUM,TOTAL FILT.REAC.	mg/L	0	12.00	18.20	5	4	80.0	275	274	99.6	4.00	15.37	17.14	1.69	100.0
NNO2PR	NITRITE,FILT. REACT.	mg/L	0	0.05	0.05	5	1	20.0	271	58	21.4	0.01	0.01	3.66	2.98	51.4
NNOTPR	NITRATES,TOTAL FILT.REAC.	mg/L	0	13.40	13.40	5	1	20.0	275	28	10.2	0.10	0.05	15.63	2.33	32.4
METALS																
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	290.00	2100.00	6	6	100.0	322	306	95.0	960.00	1000.10	2.16	2.65	97.3
CUUT	COPPER,UNFILT.TOTAL	ug/L	0	90.00	50.00	1	1	100.0	49	48	98.0	50.00	110.60	0.00	2.28	97.1
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	0.02	0.15	5	5	100.0	283	274	96.8	0.05	0.23	2.16	2.11	100.0
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	180.00	210.00	5	5	100.0	319	318	99.7	200.00	370.70	1.08	2.14	100.0
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	60.00	190.00	6	6	100.0	322	315	97.8	120.00	211.00	1.50	2.94	100.0
AGUT	SILVER,UNFILT.TOTAL	ug/L	0	10.00	10.00	5	1	20.0	321	82	25.6	10.00	10.40	1.36	2.55	75.7
MOUT	MOLYBDENUM,UNFILT.TOTAL	ug/L	0	20.00	20.00	5	1	20.0	321	41	12.8	10.00	12.40	1.36	1.72	56.8
CDUT	CADMIUM,UNFILT.TOTAL	ug/L	0	10.00	10.00	6	1	16.7	322	76	23.6	10.00	6.50	1.08	2.09	70.3
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PMBBP	BUTYLBENZYLPHTHALATE	ug/L	1	15.50	15.50	5	1	20.0	275	34	12.4	6.27	5.85	1.66	1.66	37.8
PMMCRE	M-CRESOL	ug/L	1	49.60	49.60	5	1	20.0	275	167	60.7	10.94	25.59	2.33	3.45	86.5
PMPHEN	PHENOL	ug/L	2	50.50	50.50	5	1	20.0	275	118	42.9	10.98	14.52	2.35	2.46	78.4
PESTICIDES,HERBICIDES,PCBS																
P1BHCG	GAMMA-BHC(HEXCHLORCYCLHEXANE)	ug/L	2	0.05	0.25	5	5	100.0	276	143	51.8	0.10	0.02	1.94	2.29	94.6
P324D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	0.04	0.24	5	5	100.0	276	214	77.5	0.10	0.13	2.05	3.72	100.0
P1DMDT	METHOXYCHLOR	ug/L	1	0.16	2.20	5	4	80.0	276	47	17.0	0.35	0.08	4.29	3.14	43.2
P1BHCB	BETA-BHC (HEXCHLORCYCLHEXANE)	ug/L	1	0.03	0.03	5	1	20.0	276	32	11.6	0.01	0.01	1.63	1.66	35.1
P1END2	ENDOSULFAN II	ug/L	3	0.04	0.04	5	1	20.0	276	10	3.6	0.01	0.01	1.86	1.42	21.6
P245ST	2,4,5-TRICLORPHENOXYACETIC ACID	ug/L	3	0.10	0.10	5	1	20.0	276	22	8.0	0.06	0.06	1.36	1.60	37.8

PLANT NAME :Sault St. Marie (West)
PLANT TYPE :Secondary

SAMPLING TYPE : Final Effluent
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	STD. FOR SURFACE WATER	STD. REF.	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET.	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																		
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0		-	3.50	110.00	5	5	100.0	213	211	99.1	10.73	21.22	3.89	2.07	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0		-	7.10	17.00	5	5	100.0	220	220	100.0	8.92	8.09	1.44	1.60	100.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0		-	1.10	23.00	5	5	100.0	222	222	100.0	2.12	7.97	3.81	2.71	100.0
PH	(-LOG(H+(CONCN))		0		-	6.72	7.12	5	5	100.0	224	224	100.0	6.90	7.10	1.02	1.05	100.0
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/L	0		-	0.35	3.67	6	6	100.0	211	206	97.6	0.66	0.68	2.37	1.97	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0		-	5.10	60.60	5	5	100.0	220	219	99.6	8.63	10.12	2.97	2.00	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0		-	14.00	198.00	5	4	80.0	213	211	99.1	25.85	52.80	4.18	1.83	100.0
NNO2FR	NITRITE,FILT. REACT.	mg/L	0		-	0.04	0.06	5	4	80.0	220	194	88.2	0.05	0.22	3.87	5.95	96.4
NNOTFR	NITRATES,TOTAL FILT.REAC.	mg/L	0		-	11.80	13.30	5	4	80.0	224	186	83.0	3.64	2.33	16.21	7.75	96.4
NNHTFR	AMMONIUM,TOTAL FILT.REAC.	mg/L	0		-	14.40	14.40	5	1	20.0	223	204	91.5	0.09	3.90	17.16	6.98	100.0
METALS																		
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	75.00	ONT-MOE	210.00	1300.00	6	6	100.0	264	196	74.2	340.00	101.70	1.96	3.72	96.4
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	0.20	ONT-MOE	0.01	0.17	5	5	100.0	233	220	94.4	0.02	0.03	3.21	2.62	100.0
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	3750.00	ONT-MOE	170.00	220.00	6	6	100.0	267	267	100.0	190.00	340.90	1.12	2.14	100.0
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	30.00	ONT-MOE	30.00	350.00	6	6	100.0	267	262	98.1	60.00	53.30	2.49	2.48	100.0
AGUT	SILVER,UNFILT.TOTAL	ug/L	0	0.10	ONT-MOE	10.00	10.00	6	1	16.7	267	15	5.6	10.00	6.90	1.94	1.84	32.1
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	100.00	ONT-MOE	10.00	10.00	6	1	16.7	267	137	51.3	10.00	9.00	1.33	2.00	89.3
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																		
PMBBP	BUTYLBENZYLPHTHALATE	ug/L	1	50.00	NYS-GUL	3.80	7.20	5	2	40.0	228	3	1.3	1.94	1.09	2.54	1.59	7.1
PMMCRE	M-CRESOL	ug/L	1		-	15.60	22.90	5	2	40.0	227	7	3.1	4.13	1.70	4.03	1.70	14.3
PMPHEN	PHENOL	ug/L	2	1.00	ONT-MOE	9.00	11.00	5	2	40.0	227	4	1.8	3.30	1.65	2.83	1.59	10.7
PESTICIDES,HERBICIDES,PCBS																		
P1BHCG	GAMMA-BHC(HEXCHLORCYCLHEXANE)	ug/L	2	0.06	ONT-MOE	0.04	0.06	5	4	80.0	227	137	60.2	0.03	0.02	2.71	2.48	96.4
P524D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	4.00	ONT-MOE	0.03	0.07	5	4	80.0	227	177	78.0	0.03	0.08	2.16	4.71	100.0
P1DMDT	METHOXYCHLOR	ug/L	1	0.04	ONT-MOE	0.20	0.60	5	3	60.0	227	31	13.7	0.11	0.04	4.11	2.72	35.7
P5SILV	SILVEX	ug/L	3		-	0.05	0.05	5	2	40.0	227	23	10.1	0.03	0.03	1.46	1.83	50.0
P1BHCB	BETA-BHC (HEXCHLORCYCLHEXANE)	ug/L	1	0.01	ONT-MOE	0.01	0.01	5	1	20.0	227	9	4.0	0.01	0.01	1.36	1.38	21.4
VOLATILES ORGANIC COMPOUNDS																		
X1CHLO	CHLOROFORM	ug/L	1	0.20	NYS-STD	9.50	22.00	5	4	80.0	224	37	16.5	8.40	1.37	3.49	2.18	64.3

PLANT NAME : Sault Ste. Marie (West)
PLANT TYPE : Secondary

SAMPLING TYPE : RawSludge
SAMPLE FORM : Dry Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS (DRY WEIGHT)	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
NH3TPR	AMMONIUM,TOTAL FILT REAC.	mg/kg	0	9003.22	9003.22	1	1	100.0	48	47	97.9	9003.22	5911.32	0.00	4.59	100.0
NNOTPR	NITRATES,TOTAL FILT REAC.	mg/kg	0	40.19	40.19	1	1	100.0	48	43	89.6	40.19	25.44	0.00	2.21	93.9
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/kg	0	49196.14	49196.14	1	1	100.0	51	51	100.0	49196.14	36897.85	0.00	2.98	100.0
PH	(-LOG(H+(CONCN))	mg/kg	0	6.03	6.03	1	1	100.0	49	49	100.0	6.03	6.03	0.00	1.10	100.0
PHENOL	PHENOLICS (4AAP)	mg/kg	0	151.13	151.13	1	1	100.0	50	41	82.0	151.13	82.34	0.00	3.54	85.3
PPUT	PHOSPHORUS,UNFILT.TOTAL.	mg/kg	0	26366.56	26366.56	1	1	100.0	42	42	100.0	26366.56	20347.70	0.00	4.43	100.0
RST	RESIDUE, TOTAL.	mg/kg	0	31100.00	31100.00	1	1	100.0	51	51	100.0	31100.00	32783.51	0.00	1.81	100.0
RSTLOI	RESIDUE,TOT.LOSS ON IGNI.	mg/kg	0	21500.00	21500.00	1	1	100.0	51	51	100.0	21500.00	20803.05	0.00	1.77	100.0
METALS																
ALUT	ALUMINUM,UNFILT.TOTAL.	mg/kg	0	21969.13	21969.13	1	1	100.0	51	51	100.0	21969.13	9835.74	0.00	2.51	100.0
ASUT	ARSENIC,UNFILT.TOTAL.	mg/kg	0	8.36	8.36	1	1	100.0	51	50	98.0	8.36	6.13	0.00	2.01	97.1
CDUT	CADMIUM,UNFILT.TOTAL.	mg/kg	0	2.48	2.48	1	1	100.0	43	40	93.0	2.48	9.74	0.00	4.35	90.0
COUT	COBALT,UNFILT.TOTAL.	mg/kg	0	15.76	15.76	1	1	100.0	41	30	73.2	15.76	9.29	0.00	4.69	73.3
CRUT	CHROMIUM,UNFILT.TOTAL.	mg/kg	0	79.74	79.74	1	1	100.0	51	50	98.0	79.74	301.43	0.00	3.68	97.1
CUUT	COPPER,UNFILT.TOTAL.	mg/kg	0	471.06	471.06	1	1	100.0	46	46	100.0	471.06	606.31	0.00	1.72	100.0
HGUT	MERCURY,UNFILT.TOTAL.	mg/kg	0	1.61	1.61	1	1	100.0	50	50	100.0	1.61	2.23	0.00	1.67	100.0
NIUT	NICKEL,UNFILT.TOTAL.	mg/kg	0	17.04	17.04	1	1	100.0	46	44	95.7	17.04	59.17	0.00	2.80	93.3
PBUT	LEAD,UNFILT.TOTAL.	mg/kg	0	84.57	84.57	1	1	100.0	49	48	98.0	84.57	173.99	0.00	2.24	96.9
SEUT	SELENIUM,UNFILT.TOTAL.	mg/kg	0	3.86	3.86	1	1	100.0	50	48	96.0	3.86	3.04	0.00	1.93	93.9
SRUT	STRONTIUM,UNFILT.TOTAL.	mg/kg	0	168.81	168.81	1	1	100.0	51	51	100.0	168.81	231.70	0.00	1.97	100.0
ZNUT	ZINC,UNFILT.TOTAL.	mg/kg	0	828.94	828.94	1	1	100.0	51	51	100.0	828.94	905.39	0.00	2.39	100.0
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PMB2IE	BIS(2-CHLOROISOPROPYL)ETHER	ug/kg	1	958199.40	958199.40	1	1	100.0	51	2	3.9	958199.40	3466.00	0.00	3.02	5.9
PMPHEN	PHENOL	ug/kg	2	32154.30	32154.30	1	1	100.0	51	15	29.4	32154.30	7312.80	0.00	3.00	38.2
PNPHEN	PHENANTHRENE	ug/kg	1	15176.80	15176.80	1	1	100.0	51	6	11.8	15176.80	3563.50	0.00	2.19	17.7
DIOXINS AND FURANS																
PHCDD	OCTACHLORODIBENZODIOXIN	ug/kg	1	3.00	3.00	1	1	100.0	50	25	50.0	3.00	8.50	0.00	3.60	58.8
PESTICIDES,HERBICIDES,PCBS																
P1BHCA	ALPHA-BHC(HEXACHLORCYCLOHEXANE)	ug/kg	1	12.90	12.90	1	1	100.0	51	12	23.5	12.90	5.50	0.00	2.74	39.3
P1BHCG	GAMMA-BHC(HEXACHLORCYCLOHEXANE)	ug/kg	2	9.60	9.60	1	1	100.0	51	28	54.9	9.60	8.90	0.00	2.69	67.7
P1DIEL	DIELDRIN	ug/kg	2	6.40	6.40	1	1	100.0	51	20	39.2	6.40	7.20	0.00	3.10	50.0
P1DMDT	METHOXYCHLOR	ug/kg	1	164.00	164.00	1	1	100.0	51	19	37.3	164.00	45.80	0.00	5.15	44.1
P1ENS2	ENDOSULFAN II	ug/kg	3	48.20	48.20	1	1	100.0	51	6	11.8	48.20	4.20	0.00	2.38	17.7
P1ENSS	ENDOSULFAN SULPHATE	ug/kg	3	28.90	28.90	1	1	100.0	51	6	11.8	28.90	18.60	0.00	2.80	17.7
P1HEPE	HEPTACHLOREPOXIDE	ug/kg	2	16.10	16.10	1	1	100.0	51	12	23.5	16.10	5.00	0.00	2.02	32.4
P1PCBT	PCB, TOTAL	ug/kg	2	80.40	80.40	1	1	100.0	51	40	78.4	80.40	88.70	0.00	3.18	79.4
P245T	2,4,5-TRICLOROPHENOXYACETIC ACID	ug/kg	3	321.50	321.50	1	1	100.0	51	21	41.2	321.50	48.90	0.00	3.49	47.1
P24D	2,4-DICHLOROPHENOXYACETIACODC	ug/kg	3	803.90	803.90	1	1	100.0	51	38	74.5	803.90	93.20	0.00	6.50	82.3

PLANT NAME : Sault Ste. Marie (West)
PLANT TYPE : Secondary

SAMPLING TYPE : RawSludge
SAMPLE FORM : Dry Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS (DRY WEIGHT)	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
VOLATILE ORGANIC COMPOUNDS																
B2MPXY	M-, AND P-XYLENES	ug/kg	1	11350.50	11350.50	1	1	100.0	51	16	31.4	11350.50	1345.90	0.00	3.86	41.2

PLANT NAME : Sault Ste. Marie (West)
PLANT TYPE : Secondary

SAMPLING TYPE : Treated Sludge
SAMPLE FORM : Dry Weight

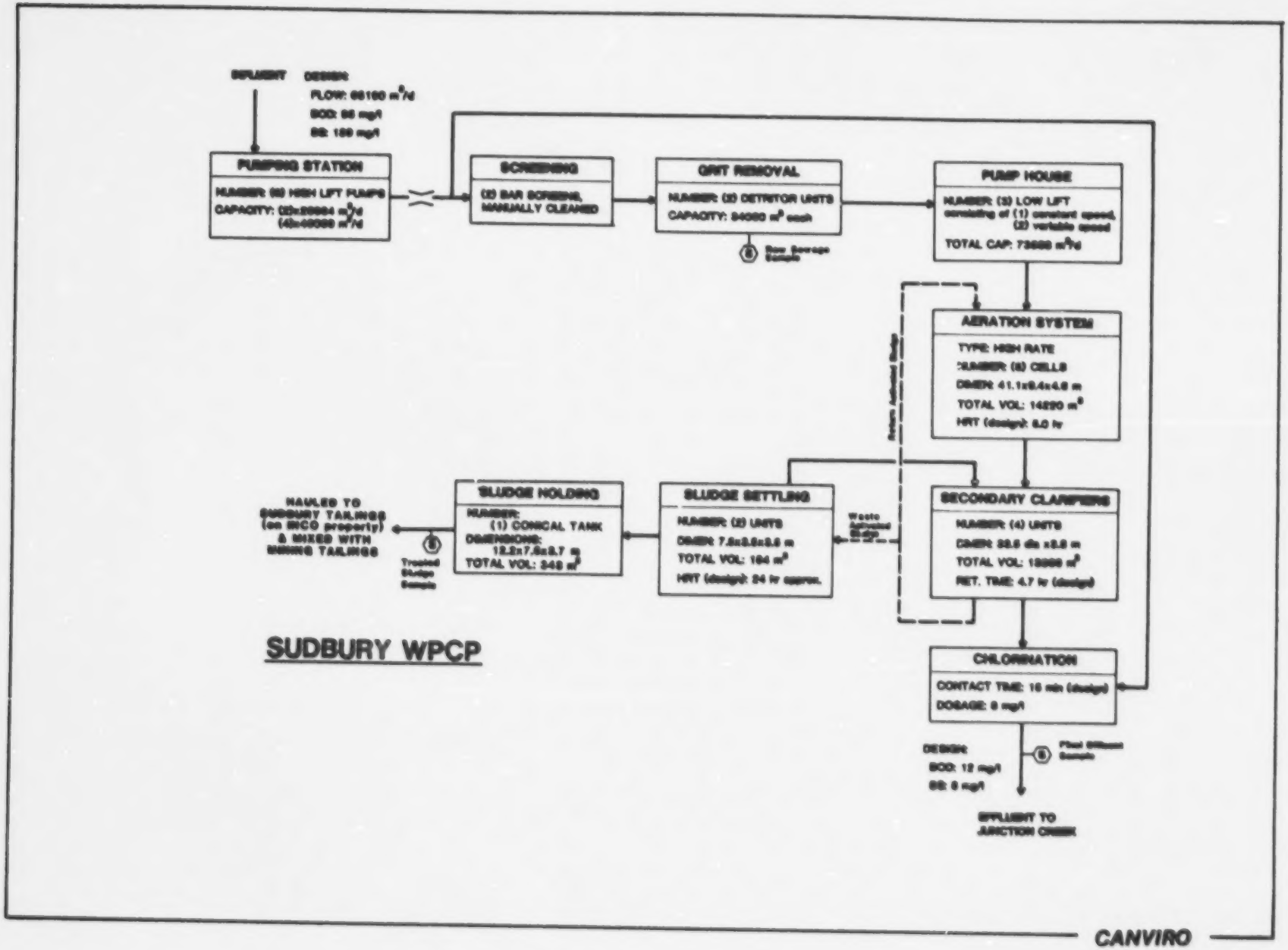
CONTAM-INANT	CONTAMINANT NAME	UNITS (DRY WEIGHT)	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
COD	CHEMICAL OXYGEN DEMAND	mg/kg	0	106374.50	106374.50	1	1	100.0	36	36	100.0	106374.50	508097.94	0.00	4.65	100.0
NNTKUR	NITROGEN-TOT-KJEL.,UNF.TOT	mg/kg	0	36799.99	36799.99	1	1	100.0	49	49	100.0	36799.99	38494.12	0.00	1.77	100.0
PH	(-LOG(H+(CONCN))	mg/kg	0	7.10	7.10	1	1	100.0	47	47	100.0	7.10	7.17	0.00	1.09	100.0
PHNOL	PHENOLICS (4AAP)	mg/kg	0	231.08	231.08	1	1	100.0	49	41	83.7	231.08	43.05	0.00	3.14	87.9
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/kg	0	5374160.00	5374160.00	1	1	100.0	43	43	100.0	5374160.00	76638.67	0.00	6.91	100.0
RST	RESIDUE, TOTAL	mg/kg	0	251000.00	251000.00	1	1	100.0	50	50	100.0	251000.00	80434.04	0.00	3.23	100.0
RSTLOI	RESIDUE,TOT.LOSS ON IGNI.	mg/kg	0	177834.00	177834.00	1	1	100.0	50	50	100.0	177834.00	43379.33	0.00	3.19	100.0
METALS																
ALUT	ALUMINUM,UNFILT.TOTAL	mg/kg	0	17487.73	17487.73	1	1	100.0	50	50	100.0	17487.73	10715.94	0.00	2.82	100.0
ASUT	ARSENIC,UNFILT.TOTAL	mg/kg	0	5.98	5.98	1	1	100.0	50	49	98.0	5.98	5.40	0.00	2.06	97.1
CDUT	CADMIUM,UNFILT.TOTAL	mg/kg	0	2.51	2.51	1	1	100.0	45	41	91.1	2.51	10.47	0.00	3.98	90.3
CRUT	CHROMIUM,UNFILT.TOTAL	mg/kg	0	72.27	72.27	1	1	100.0	50	50	100.0	72.27	333.06	0.00	3.59	100.0
CUUT	COPPER,UNFILT.TOTAL	mg/kg	0	711.08	711.08	1	1	100.0	45	45	100.0	711.08	732.24	0.00	2.16	100.0
HGUT	MERCURY,UNFILT.TOTAL	mg/kg	0	1.79	1.79	1	1	100.0	50	49	98.0	1.79	3.24	0.00	2.04	97.1
PBUT	LEAD,UNFILT.TOTAL	mg/kg	0	83.82	83.82	1	1	100.0	50	49	98.0	83.82	196.62	0.00	2.46	97.1
SEUT	SELENIUM,UNFILT.TOTAL	mg/kg	0	2.79	2.79	1	1	100.0	50	48	96.0	2.79	2.67	0.00	2.98	97.1
SRUT	STRONTIUM,UNFILT.TOTAL	mg/kg	0	123.98	123.98	1	1	100.0	50	50	100.0	123.98	240.93	0.00	2.54	100.0
ZNUT	ZINC,UNFILT.TOTAL	mg/kg	0	807.53	807.53	1	1	100.0	50	50	100.0	807.53	988.90	0.00	2.57	100.0
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PNPHEN	PHENANTHRENE	ug/kg	1	11155.40	11155.40	1	1	100.0	50	12	24.0	11155.40	2220.50	0.00	4.27	26.5
DIOXINS AND FURANS																
P9CDD	OCTACHLORODIBENZODIOXIN	ug/kg	1	5.20	5.20	1	1	100.0	49	26	53.1	5.20	7.10	0.00	3.84	64.7
PESTICIDES,HERBICIDES,PCBS																
P1BHCA	ALPHA-BHC(HEXACHLORCYCLOHEXANE)	ug/kg	1	8.80	8.80	1	1	100.0	50	11	22.0	8.80	5.60	0.00	3.00	32.4
P1BHCG	GAMMA-BHC(HEXACHLORCYCLOHEXANE)	ug/kg	2	91.90	91.90	1	1	100.0	50	12	24.0	91.90	5.70	0.00	3.13	35.3
P1END2	ENDOSULFAN II	ug/kg	3	12.30	12.30	1	1	100.0	50	7	14.0	12.30	4.70	0.00	2.67	20.6
P1PPDT	PP-DDT	ug/kg	3	37.30	37.30	1	1	100.0	50	5	10.0	37.30	16.70	0.00	2.14	14.7

Sub-Appendix A-27

Sudbury WPCP

Contents:

- Plant Schematic with Design Characteristics
- Annual Data Review (1981 - 1986 Plant Performance)
- Sources of Municipal Water Pollution Control Plant Raw Sewage
- Operational Evaluation for Sudbury WPCP
- Analytical Data


INFLUENT
DESIGN:
FLOW: 68100 m³/d
BOD: 86 mg/l
SS: 189 mg/l
PUMPING STATION
NUMBER: (6) HIGH LIFT PUMPS
CAPACITY: (2)x26984 m³/d
(4)x40000 m³/d
SCREENING
(2) BAR SCREENS, MANUALLY CLEANED
GRIT REMOVAL
NUMBER: (2) DETRITOR UNITS
CAPACITY: 34000 m³ each
Raw Sewage Sample
PUMP HOUSE
NUMBER: (3) LOW LIFT
consisting of (1) constant speed, (2) variable speed
TOTAL CAP: 73688 m³/d
AERATION SYSTEM
TYPE: HIGH RATE
NUMBER: (8) CELLS
DIMEN: 41.1x9.4x4.8 m
TOTAL VOL: 14220 m³
HRT (design): 6.0 hr
Return Activated Sludge
SECONDARY CLARIFIERS
NUMBER: (4) UNITS
DIMEN: 33.5 dia x3.8 m
TOTAL VOL: 13388 m³
RET. TIME: 4.7 hr (design)
Waste Activated Sludge
SLUDGE SETTLING
NUMBER: (2) UNITS
DIMEN: 7.5x3.5x3.5 m
TOTAL VOL: 184 m³
HRT (design): 24 hr approx.
SLUDGE HOLDING
NUMBER:
(1) CONICAL TANK
DIMENSIONS:
12.2x7.5x3.7 m
TOTAL VOL: 348 m³
Treated Sludge Sample
HAULED TO SUDBURY TAILINGS (on INCO property) & MIXED WITH MINING TAILINGS
CHLORINATION
CONTACT TIME: 16 min (design)
DOSAGE: 8 mg/l
Final Effluent Sample
DESIGN:
BOD: 12 mg/l
SS: 8 mg/l
EFFLUENT TO JUNCTION CREEK
SUDBURY WPCP
CANVIRO

SUDBURY WPCP
High Rate Activated Sludge
Capacity - 61.371 10(3)m3/day

PARAMETER	1981	1982	1983	1984	1985	5 YEAR AVERAGE 1981 - 85
Avg. Daily Flow (1000 m3/day)	52.12	51.19	54.85	54.88	52.80	53.81
BOD5 - Influent (mg/L)	86.10	99.80	79.26	88.10	88.50	86.75
BOD5 - Effluent (mg/L)	11.60	17.30	16.56	9.99	11.87	13.46
Annual BOD5 Significantly Different from Mean Annual Average BOD5?	I.D.	I.D.	I.D.	I.D.	I.D.	
TSS - Influent (mg/L)	115.40	85.60	74.33	96.72	109.60	96.34
TSS - Effluent (mg/L)	12.70	10.00	13.10	9.38	8.32	10.70
Annual TSS Significantly Different from Mean Annual Average TSS?	I.D.	I.D.	I.D.	I.D.	I.D.	
Total P - Influent (mg/L)	4.70	5.40	3.87	3.82	4.24	4.41
Total P - Effluent (mg/L)	2.20	1.90	1.49	1.84	2.10	1.91
Annual TP Significantly Different from Mean Annual Average TP?	I.D.	I.D.	I.D.	I.D.	I.D.	
TP in Compliance?	N	N	N	N	N	N

I.D. - Insufficient Data

R

SOURCES OF MUNICIPAL WATER POLLUTION CONTROL PLANT RAW SEWAGE

GENERAL DESCRIPTION OF WATER POLLUTION CONTROL PLANT (WPCP)

NAME OF WPCP	SUDBURY WPCP
WORKS NUMBER	110000711
TREATMENT TYPE	HIGH RATE
DESIGN CAPACITY (1000 m3/d)	68.190
1986 AVERAGE DAY FLOW (1000 m3/d)	50.910
POPULATION SERVED	95000

% OF TOTAL FLOW ATTRIBUTED TO:

INDUSTRIAL SOURCES (%)	1
COMMERCIAL SOURCES (%) (Population x 0.0757)	14
RESIDENTIAL SOURCES (%) (Population x 0.175)	33
UNACCOUNTED FOR, INCL. INFILTRATION (100-% Contributed from industrial, commercial and residential sources)	52

PROFILE OF INDUSTRIES IN CATCHMENT

TOTAL NO OF INDUSTRIES	93
INDUSTRIES WITH WATER	18
NO OF SIC CATEGORIES	23

DESCRIPTION OF THE TOP 5 INDUSTRIES DISCHARGED TO THE WPCP (BASED ON WATER USE DATA)

DESCRIPTION	SIC	# OF COMPANIES
BEVERAGES	2082-2087	3
DAIRY	2021-2026	1
MEAT	2011-2013	2
MISC FOOD PROCESSING	2095-2099	1
MISC FABRICATED METAL PRODUCTS	3490-3499	2

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OPERATIONAL EVALUATION FOR: S U D B U R Y M P C P

TREATMENT FACILITY: Other (High Rate Activated Sludge)
PERIOD ENDING: May 15, 1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 61,190 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
RAW SEWAGE FLOW	60,308	58,258	56,017	55,190	55,481	53,226	49,311
% of Design Flow	98.56%	95.21%	91.55%	90.19%	90.67%	86.98%	80.59%
Influent BOD (mg/L)							
Primary BOD (mg/L)							
Secondary BOD (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent SS (mg/L)	141.0		132.0		105.0		
Primary SS (mg/L)							
Secondary SS (mg/L)	10.4		6.0		8.6		
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	92.6		95.5		91.8		
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)							
Primary Total P (mg/L)							
Secondary Total P (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							

OPERATIONAL EVALUATION FOR: SUDBURY MPCP

TREATMENT FACILITY: Other (High Rate Activated Sludge)
PERIOD ENDING: May 15, 1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 61,190 m3/d

PARAMETER	PRE-SAMPLING PERIOD						
	DAY 8	DAY 9	DAY 10	DAY 11	DAY 12	DAY 13	DAY 14
RAW SEWAGE FLOW	52,326	52,962	51,735	50,325	51,462	48,548	4,467
% of Design Flow	85.51%	86.55%	84.55%	82.24%	84.10%	79.34%	7.30%
Influent BOD (mg/L)	93.2						
Primary BOD (mg/L)							
Secondary BOD (mg/L)	11.2						
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	88.0						
Influent SS (mg/L)	118.0	66.0	110.0		104.5		
Primary SS (mg/L)							
Secondary SS (mg/L)	11.0	9.0	7.2		4.6		
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	90.7	86.4	93.5		95.6		
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)	0.3						
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)	23.8						
Primary TKN (mg/L)							
Secondary TKN (mg/L)	2.0						
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	91.6						
Influent Total P (mg/L)	4.55						
Primary Total P (mg/L)							
Secondary Total P (mg/L)	2.46						
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	45.9						

OPERATIONAL EVALUATION FOR: S U D B U R Y W P C P

TREATMENT FACILITY: Other (High Rate Activated Sludge)
PERIOD ENDING: May 15, 1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 61,190 m3/d

PARAMETER	SAMPLING PERIOD						
	DAY 15	DAY 16	DAY 17	DAY 18	DAY 19	DAY 20	DAY 21
RAW SEWAGE FLOW	49,334	46,747	45,738	50,453	48,200		
% of Design Flow	80.62%	76.40%	74.75%	82.45%	78.77%		
Influent BOD (mg/L)							
Primary BOD (mg/L)							
Secondary BOD (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent SS (mg/L)	135.0		114.0		102.0		
Primary SS (mg/L)							
Secondary SS (mg/L)	7.4		4.8		7.0		
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	94.5		95.8		93.1		
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)							
Primary Total P (mg/L)							
Secondary Total P (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							

PLANT NAME : Sudbury
PLANT TYPE : Secondary

SAMPLING TYPE : Raw Sewage
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0	83.00	97.90	5	5	100.0	267	266	99.6	88.91	140.23	1.08	1.93	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0	156.00	226.00	5	5	100.0	260	258	99.2	186.78	287.75	1.16	1.82	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0	12.50	18.00	5	5	100.0	271	271	100.0	14.76	22.39	1.16	1.81	100.0
NNHTPR	AMMONIUM,TOTAL FILT.REAC.	mg/L	0	14.90	15.10	5	5	100.0	275	274	99.6	14.96	15.37	1.01	1.69	100.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0	21.00	27.00	5	5	100.0	273	273	100.0	23.64	25.44	1.10	1.47	100.0
PH	(-LOG(H+(CONCN))		0	6.53	9.27	5	5	100.0	275	275	100.0	7.11	6.90	1.16	1.05	100.0
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/L	0	3.88	4.58	5	5	100.0	248	248	100.0	4.32	5.18	1.08	1.51	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0	50.80	124.00	5	5	100.0	267	266	99.6	74.87	126.88	1.42	1.93	100.0
NNO2PR	NITRITE,FILT. REACT.	mg/L	0	0.01	0.02	5	4	80.0	271	58	21.4	0.01	0.01	2.18	2.98	51.4
NNOTPR	NITRATES,TOTAL FILT.REAC.	mg/L	0	0.05	0.10	5	4	80.0	275	28	10.2	0.07	0.05	1.42	2.33	32.4
METALS																
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	270.00	640.00	6	6	100.0	322	306	95.0	350.00	1000.10	1.38	2.65	97.3
CUUT	COPPER,UNFILT.TOTAL	ug/L	0	50.00	50.00	1	1	100.0	49	48	98.0	50.00	110.60	0.00	2.28	97.1
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	0.12	0.40	5	5	100.0	283	274	96.8	0.21	0.23	1.56	2.11	100.0
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	80.00	90.00	6	6	100.0	319	318	99.7	80.00	370.70	1.07	2.14	100.0
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	40.00	110.00	6	6	100.0	322	315	97.8	80.00	211.00	1.44	2.94	100.0
NIUT	NICKEL,UNFILT.TOTAL	ug/L	0	70.00	130.00	6	5	83.3	322	103	32.0	70.00	38.80	1.76	2.70	54.1
AGUT	SILVER,UNFILT.TOTAL	ug/L	0	10.00	50.00	6	3	50.0	321	82	25.6	10.00	10.40	2.44	2.55	75.7
COUT	COBALT,UNFILT.TOTAL	ug/L	0	10.00	70.00	6	3	50.0	322	82	25.5	10.00	9.30	2.78	2.31	83.8
CDUT	CADMIUM,UNFILT.TOTAL	ug/L	0	20.00	20.00	6	1	16.7	322	76	23.6	10.00	6.50	1.76	2.09	70.3
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	20.00	20.00	6	1	16.7	322	237	73.6	10.00	51.10	1.33	3.44	89.2
MOUT	MOLYBDENUM,UNFILT.TOTAL	ug/L	0	40.00	40.00	6	1	16.7	321	41	12.8	10.00	12.40	1.76	1.72	56.8
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PMMCRE	M-CRESOL	ug/L	1	16.30	97.60	5	4	80.0	275	167	60.7	27.30	25.59	2.90	3.45	86.3
PMPHEN	PHENOL	ug/L	2	21.30	31.90	5	2	40.0	275	118	42.9	12.34	14.52	2.01	2.46	78.4
PESTICIDES,HERBICIDES,PCBS																
P1BHCG	GAMMA-BHC(HEXCHLORCYCLHEXANE)	ug/L	2	0.03	0.04	5	5	100.0	276	143	51.8	0.03	0.02	1.14	2.29	94.6
P324D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	0.38	0.65	5	5	100.0	276	214	77.5	0.47	0.13	1.24	3.72	100.0
VOLATILES ORGANIC COMPOUNDS																
B2MPXY	M-, AND P-XYLENES	ug/L	1	42.00	42.00	5	1	20.0	274	43	15.7	23.20	26.00	1.39	2.02	37.8
X1CHLO	CHLOROFORM	ug/L	1	140.00	140.00	5	1	20.0	274	28	10.2	29.52	23.90	2.39	1.75	32.4

PLANT NAME : Sudbury
PLANT TYPE : Secondary

SAMPLING TYPE : Final Effluent
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	STD. FOR SURFACE WATER	STD. REF.	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET.	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																		
BODS	BOD, 5 DAY -TOTAL DEMAND	mg/L	0		-	30.00	73.80	5	5	100.0	213	211	99.1	46.15	21.22	1.48	2.07	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0		-	60.00	132.00	5	5	100.0	213	211	99.1	81.28	52.80	1.34	1.83	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0		-	8.40	10.40	5	5	100.0	220	220	100.0	9.45	8.09	1.09	1.60	100.0
NNHTPR	AMMONIUM,TOTAL FILT.REAC.	mg/L	0		-	1.25	3.90	5	5	100.0	223	204	91.5	2.44	3.90	1.52	6.98	100.0
NNO2PR	NITRITE,FILT. REACT.	mg/L	0		-	0.97	1.12	5	5	100.0	220	194	88.2	1.06	0.22	1.06	5.95	96.4
NNOTPR	NITRATES,TOTAL FILT.REAC.	mg/L	0		-	6.65	9.65	5	5	100.0	224	186	83.0	8.04	2.33	1.14	7.75	96.4
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0		-	3.10	5.70	5	5	100.0	222	222	100.0	4.61	7.97	1.26	2.71	100.0
PH	(-LOG(H+(CONCN))		0		-	6.76	7.92	5	5	100.0	224	224	100.0	7.21	7.10	1.07	1.05	100.0
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/L	0		-	2.41	2.75	5	5	100.0	211	206	97.6	2.58	0.68	1.07	1.97	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0		-	8.20	12.90	5	5	100.0	220	219	99.6	10.93	10.12	1.24	2.00	100.0
METALS																		
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	75.00	ONT-MOE	50.00	110.00	6	6	100.0	264	196	74.2	80.00	101.70	1.31	3.72	96.4
CUUT	COPPER,UNFILT.TOTAL	ug/L	0	5.00	ONT-MOE	10.00	10.00	1	1	100.0	47	30	63.8	10.00	13.10	0.00	2.56	77.8
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	0.20	ONT-MOE	0.04	0.05	5	5	100.0	233	220	94.4	0.04	0.03	1.10	2.62	100.0
NIUT	NICKEL,UNFILT.TOTAL	ug/L	0	25.00	ONT-MOE	80.00	100.00	6	6	100.0	267	171	64.0	90.00	22.10	1.07	3.60	83.7
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	3750.00	ONT-MOE	80.00	90.00	6	6	100.0	267	267	100.0	80.00	340.90	1.05	2.14	100.0
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	30.00	ONT-MOE	50.00	70.00	6	6	100.0	267	262	98.1	60.00	53.30	1.16	2.48	100.0
COUT	COBALT,UNFILT.TOTAL	ug/L	0	3.00	NYS-STD	10.00	20.00	6	3	50.0	266	65	24.4	10.00	6.40	1.76	1.54	82.1
MOUT	MOLYBDENUM,UNFILT.TOTAL	ug/L	0		-	10.00	20.00	6	3	50.0	267	75	28.1	10.00	6.60	1.98	1.56	67.9
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	100.00	ONT-MOE	10.00	10.00	6	1	16.7	267	137	51.3	10.00	9.00	1.33	2.00	89.3
DIOXINS AND FURANS																		
P97CDD	HEPTACHLORODIBENZODIOXIN	ng/L	1	1.50	ONT-MOE	1.40	1.40	1	1	100.0	44	2	4.6	1.40	0.38	0.00	3.74	7.1
PESTICIDES,HERBICIDES,PCBS																		
P1BHCG	GAMMA-BHC(HEXCHLORCYCLHEXANE)	ug/L	2	0.06	ONT-MOE	0.03	0.04	5	5	100.0	227	157	69.2	0.03	0.02	1.14	2.48	96.4
P324D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	4.00	ONT-MOE	0.02	0.78	5	5	100.0	227	177	78.0	0.19	0.08	3.99	4.71	100.0
P1PCBT	PCB, TOTAL	ug/L	2	0.00	ONT-MOE	0.05	0.05	5	1	20.0	227	9	4.0	0.02	0.02	1.51	1.40	28.6
P38IL.V	SILVEX	ug/L	5		-	0.09	0.09	5	1	20.0	227	23	10.1	0.03	0.03	1.77	1.83	50.0
VOLATILES ORGANIC COMPOUNDS																		
X1CHLO	CHLOROFORM	ug/L	1	0.20	NYS-STD	4.20	11.00	5	2	40.0	224	37	16.5	2.15	1.37	3.01	2.18	64.3
X1TETR	TETRACHLOROETHYLENE	ug/L	1	0.70	NYS-GUL	2.00	2.00	5	1	20.0	224	18	8.0	1.15	1.18	1.36	1.93	32.1

PLANT NAME : Sudbury
PLANT TYPE : Secondary

SAMPLING TYPE : Treated Sludge
SAMPLE FORM : Dry Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS (DRY WEIGHT)	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
COD	CHEMICAL OXYGEN DEMAND	mg/kg	0	1040892.19	1040892.19	1	1	100.0	36	36	100.0	1040892.19	508097.94	0.00	4.65	100.0
NMTITPR	AMMONIUM,TOTAL FILT.REAC.	mg/kg	0	20260.22	20260.22	1	1	100.0	25	25	100.0	20260.22	17658.28	0.00	2.92	100.0
NNOTPR	NITRATES,TOTAL FILT.REAC.	mg/kg	0	59.48	59.48	1	1	100.0	26	23	88.5	59.48	42.68	0.00	2.29	95.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/kg	0	70631.97	70631.97	1	1	100.0	49	49	100.0	70631.97	38494.12	0.00	1.77	100.0
PH	(-LOG(H+(CONCN))	mg/kg	0	5.99	5.99	1	1	100.0	47	47	100.0	5.99	7.17	0.00	1.09	100.0
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/kg	0	20074.35	20074.35	1	1	100.0	43	43	100.0	20074.35	76638.67	0.00	6.91	100.0
RST	RESIDUE, TOTAL	mg/kg	0	26900.00	26900.00	1	1	100.0	50	50	100.0	26900.00	80434.06	0.00	3.23	100.0
RSTLOI	RESIDUE,TOT.LOSS ON IGNI.	mg/kg	0	19300.00	19300.00	1	1	100.0	50	50	100.0	19300.00	43379.33	0.00	3.19	100.0
METALS																
AGUT	SILVER,UNFILT.TOTAL	mg/kg	0	66.91	66.91	1	1	100.0	44	44	100.0	66.91	37.78	0.00	2.33	100.0
ALUT	ALUMINUM,UNFILT.TOTAL	mg/kg	0	5576.21	5576.21	1	1	100.0	50	50	100.0	5576.21	10715.94	0.00	2.82	100.0
ASUT	ARSENIC,UNFILT.TOTAL	mg/kg	0	2.97	2.97	1	1	100.0	50	49	98.0	2.97	5.40	0.00	2.06	97.1
CDUT	CADMIUM,UNFILT.TOTAL	mg/kg	0	5.58	5.58	1	1	100.0	45	41	91.1	5.58	10.47	0.00	3.98	90.3
COUT	COBALT,UNFILT.TOTAL	mg/kg	0	10.04	10.04	1	1	100.0	39	32	82.1	10.04	9.14	0.00	2.75	85.7
CRUT	CHROMIUM,UNFILT.TOTAL	mg/kg	0	21.56	21.56	1	1	100.0	50	50	100.0	21.56	333.06	0.00	3.59	100.0
CUUT	COPPER,UNFILT.TOTAL	mg/kg	0	983.27	983.27	1	1	100.0	45	45	100.0	983.27	732.24	0.00	2.16	100.0
HGUT	MERCURY,UNFILT.TOTAL	mg/kg	0	3.72	3.72	1	1	100.0	50	49	98.0	3.72	3.24	0.00	2.04	97.1
NIUT	NICKEL,UNFILT.TOTAL	mg/kg	0	275.09	275.09	1	1	100.0	45	42	93.3	275.09	72.95	0.00	2.95	90.0
PBUT	LEAD,UNFILT.TOTAL	mg/kg	0	144.98	144.98	1	1	100.0	50	49	98.0	144.98	196.62	0.00	2.46	97.1
SEUT	SELENIUM,UNFILT.TOTAL	mg/kg	0	6.69	6.69	1	1	100.0	50	48	96.0	6.69	2.67	0.00	2.98	97.1
SRUT	STRONTIUM,UNFILT.TOTAL	mg/kg	0	66.91	66.91	1	1	100.0	50	50	100.0	66.91	240.93	0.00	2.54	100.0
ZNUT	ZINC,UNFILT.TOTAL	mg/kg	0	408.92	408.92	1	1	100.0	50	50	100.0	408.92	988.90	0.00	2.57	100.0
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PMBBP	BUTYLBENZYLPHTHALATE	ug/kg	1	914498.10	914498.10	1	1	100.0	50	8	16.0	914498.10	1916.90	0.00	5.23	17.7
PMMCRE	M-CRESOL	ug/kg	1	2211895.90	2211895.90	1	1	100.0	50	15	30.0	2211895.90	5281.80	0.00	8.20	35.3
PMPHEN	PHENOL	ug/kg	2	31126.40	31126.40	1	1	100.0	50	3	6.0	31126.40	2108.80	0.00	3.65	8.8
PESTICIDES,HERBICIDES,PCBS																
P1BHCG	GAMMA-BHC(HEXCHLORCYCLHEXANE)	ug/kg	2	22.30	22.30	1	1	100.0	50	12	24.0	22.30	5.70	0.00	3.13	35.3
P1DMDT	METHOXYCHLOR	ug/kg	1	74.30	74.30	1	1	100.0	50	15	30.0	74.30	34.10	0.00	4.42	38.2
P1PPDD	PP-DDE	ug/kg	1	11.20	11.20	1	1	100.0	50	34	68.0	11.20	11.10	0.00	2.72	73.5
X2HCB	HEXACHLOROBENZENE	ug/kg	2	1.10	1.10	1	1	100.0	50	21	42.0	1.10	7.00	0.00	2.96	55.9

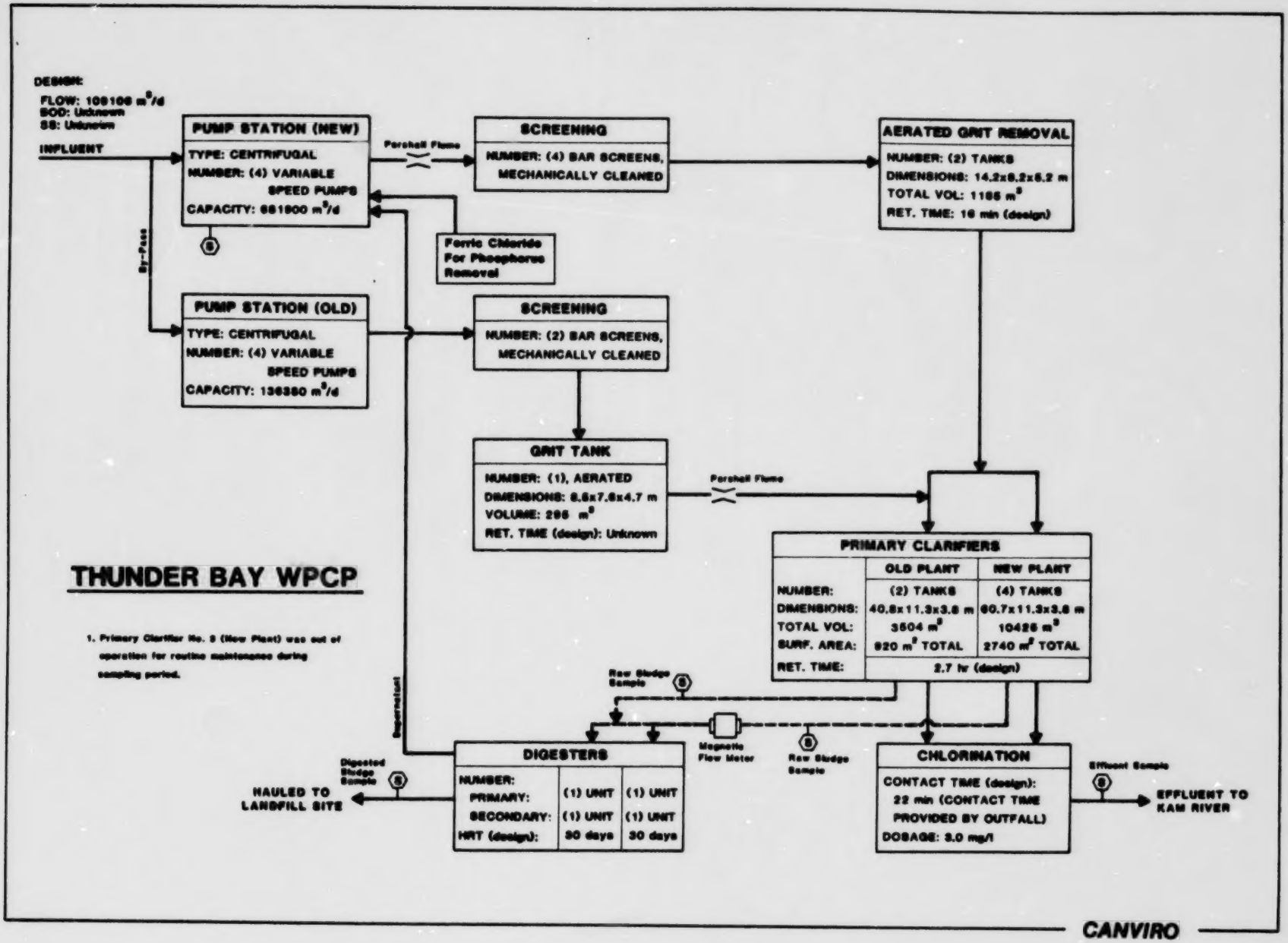
Sub-Appendix A-28

Thunder Bay WPCP

Contents:

- Plant Schematic with Design Characteristics
- Annual Data Review (1981 - 1986 Plant Performance)
- Sources of Municipal Water Pollution Control Plant Raw Sewage
- Operational Evaluation for Thunder Bay WPCP
- Analytical Data

(KIR18/28A)


DESIGN:
FLOW: 109166 m³/d
BOD: Unknown
SS: Unknown
INFLUENT
PUMP STATION (NEW)
TYPE: CENTRIFUGAL
NUMBER: (4) VARIABLE SPEED PUMPS
CAPACITY: 681600 m³/d
Parshall Flume
SCREENING
NUMBER: (4) BAR SCREENS, MECHANICALLY CLEANED
AERATED GRIT REMOVAL
NUMBER: (2) TANKS
DIMENSIONS: 14.2x6.2x6.2 m
TOTAL VOL: 1186 m³
RET. TIME: 16 min (design)
By-Pass
Ferric Chloride For Phosphorus Removal
PUMP STATION (OLD)
TYPE: CENTRIFUGAL
NUMBER: (4) VARIABLE SPEED PUMPS
CAPACITY: 136380 m³/d
SCREENING
NUMBER: (2) BAR SCREENS, MECHANICALLY CLEANED
GRIT TANK
NUMBER: (1), AERATED
DIMENSIONS: 8.6x7.6x4.7 m
VOLUME: 295 m³
RET. TIME (design): Unknown
Parshall Flume
PRIMARY CLARIFIERS
OLD PLANT
NEW PLANT
NUMBER: (2) TANKS (4) TANKS
DIMENSIONS: 40.8x11.3x3.8 m 60.7x11.3x3.8 m
TOTAL VOL: 3504 m³ 10426 m³
SURF. AREA: 920 m² TOTAL 2740 m² TOTAL
RET. TIME: 2.7 hr (design)
THUNDER BAY WPCP
1. Primary Clarifier No. 3 (New Plant) was out of operation for routine maintenance during sampling period.
Raw Sludge Sample
Supernatant
Magnetic Flow Meter
Raw Sludge Sample
DIGESTERS
NUMBER: PRIMARY: (1) UNIT (1) UNIT
SECONDARY: (1) UNIT (1) UNIT
HRT (design): 30 days 30 days
Digested Sludge Sample
HAULED TO LANDFILL SITE
CHLORINATION
CONTACT TIME (design): 22 min (CONTACT TIME PROVIDED BY OUTFALL)
DOSAGE: 3.0 mg/l
Effluent Sample
EFFLUENT TO KAM RIVER
CANVIRO

THUNDER BAY WPCP
Primary
Phosphorus Removal - Continuous
Capacity - 109.104 10(3)m3/day

PARAMETER	1981	1982	1983	1984	1985	5 YEAR AVERAGE 1981 - 85
Avg. Daily Flow (1000 m3/day)	81.74	96.83	100.45	104.15	113.77	99.39
BOD5 - Influent (mg/L)	124.70	165.30	116.83	132.46	138.25	135.51
BOD5 - Effluent (mg/L)	53.10	69.60	46.93	54.31	51.40	55.07
Annual BOD5 Significantly Different from Mean Annual Average BOD5?	I.D.	I.D.	I.D.	I.D.	I.D.	
TSS - Influent (mg/L)	194.50	298.00	158.04	139.77	209.67	208.31
TSS - Effluent (mg/L)	53.60	76.10	42.60	36.50	33.71	48.52
Annual TSS Significantly Different from Mean Annual Average TSS?	I.D.	I.D.	I.D.	I.D.	I.D.	
Total P - Influent (mg/L)	4.90	6.30	4.09	3.02	3.44	4.52
Total P - Effluent (mg/L)	3.14	3.10	1.61	1.27	1.01	2.03
Annual TP Significantly Different from Mean Annual Average TP?	I.D.	I.D.	I.D.	I.D.	I.D.	
TP in Compliance?	N	N	N	N	N	N

I.D. - Insufficient Data

R

SOURCES OF MUNICIPAL WATER POLLUTION CONTROL PLANT RAW SEWAGE

GENERAL DESCRIPTION OF WATER POLLUTION CONTROL PLANT (WPCP)

NAME OF WPCP	THUNDER BAY WPCP
WORKS NUMBER	120004805
TREATMENT TYPE	PRIMARY
	PHOSPHORUS REMOVAL CONTINUOUS
DESIGN CAPACITY (1000 m3/d)	109.104
1986 AVERAGE DAY FLOW (1000 m3/d)	92.183
POPULATION SERVED	101527

% OF TOTAL FLOW ATTRIBUTED TO:

INDUSTRIAL SOURCES (%)	9
COMMERCIAL SOURCES (%) (Population x 0.0757)	8
RESIDENTIAL SOURCES (%) (Population x 0.175)	19
UNACCOUNTED FOR, INCL. INFILTRATION (100-% Contributed from industrial, commercial and residential sources)	63

PROFILE OF INDUSTRIES IN CATCHMENT

TOTAL NO OF INDUSTRIES	206
INDUSTRIES WITH WATER	123
NO OF SIC CATEGORIES	29

DESCRIPTION OF THE TOP 5 INDUSTRIES DISCHARGED TO THE WPCP (BASED ON WATER USE DATA)

DESCRIPTION	SIC	# OF COMPANIES
PULP,PAPER,PAPERBOARD MILLS	2600-2631	5
PRINTING AND PUBLISHING	2700-2799	15
BEVERAGES	2082-2087	5
TRANSPORTATION EQ'T	3711-3799	4
PHOSPHATE MFG	2819-2819	2

R

OPERATIONAL EVALUATION FOR: THUNDER BAY MPCP

TREATMENT FACILITY: Primary
PERIOD ENDING: June 5, 1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 109,106 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
RAW SEWAGE FLOW							
% of Design Flow							
Influent BOD (mg/L)							
Primary BOD (mg/L)							
Secondary BOD (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent SS (mg/L)							
Primary SS (mg/L)							
Secondary SS (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)							
Primary Total P (mg/L)							
Secondary Total P (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							

DATA NOT PRESENTLY AVAILABLE

OPERATIONAL EVALUATION FOR: THUNDER BAY WPCP

TREATMENT FACILITY: Primary
PERIOD ENDING: June 5, 1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 109,106 m3/d

PARAMETER	PRE-SAMPLING PERIOD						
	DAY 8	DAY 9	DAY 10	DAY 11	DAY 12	DAY 13	DAY 14
RAW SEWAGE FLOW							
% of Design Flow							
Influent BOD (mg/L)							
Primary BOD (mg/L)							
Secondary BOD (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent SS (mg/L)							
Primary SS (mg/L)							
Secondary SS (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)							
Primary Total P (mg/L)							
Secondary Total P (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							

DATA NOT PRESENTLY AVAILABLE

OPERATIONAL EVALUATION FOR: THUNDER BAY WPCP

TREATMENT FACILITY: Primary
PERIOD ENDING: June 5, 1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 109,106 m3/d

PARAMETER	SAMPLING PERIOD DAY 15	DAY 16	DAY 17	DAY 18	DAY 19	DAY 20	DAY 21
RAW SEWAGE FLOW							
% of Design Flow							
Influent BOD (mg/L)							
Primary BOD (mg/L)							
Secondary BOD (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent SS (mg/L)							
Primary SS (mg/L)							
Secondary SS (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)							
Primary Total P (mg/L)							
Secondary Total P (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							

DATA NOT PRESENTLY AVAILABLE

PLANT NAME : Thunder Bay
PLANT TYPE : Primary

SAMPLING TYPE : Raw Sewage
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	PLANT MIN. CONC. > MDL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0	104.00	330.00	5	5	100.0	267	266	99.6	161.46	140.23	1.54	1.93	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0	256.00	328.00	5	5	100.0	260	258	99.2	295.42	287.75	1.10	1.82	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0	15.00	21.00	5	5	100.0	271	271	100.0	17.59	22.39	1.13	1.81	100.0
NNHTPR	AMMONIUM,TOTAL FILT.REAC.	mg/L	0	11.20	13.50	5	5	100.0	275	274	99.6	12.09	15.37	1.08	1.69	100.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0	20.00	34.50	5	5	100.0	273	273	100.0	24.70	25.44	1.26	1.47	100.0
PH	(-LOG(H+(CONCN))		0	6.96	7.00	5	5	100.0	275	275	100.0	6.97	6.90	1.00	1.05	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0	93.60	303.00	5	5	100.0	267	266	99.6	147.32	126.88	1.62	1.93	100.0
RSPLOI	RESIDUE,PART.LOSS ON IGNI.	mg/L	0	69.40	150.00	5	5	100.0	90	89	98.9	103.24	100.84	1.39	1.78	100.0
NNO2PR	NITRITE,FILT. REACT.	mg/L	0	0.03	0.03	5	1	20.0	271	58	21.4	0.01	0.01	2.39	2.98	51.4
METALS																
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	570.00	2800.00	6	6	100.0	322	306	95.0	1260.00	1000.10	1.78	2.65	97.3
CUUT	COPPER,UNFILT.TOTAL	ug/L	0	100.00	100.00	1	1	100.0	49	48	98.0	100.00	110.60	0.00	2.28	97.1
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	0.21	1.60	5	5	100.0	283	274	96.8	0.35	0.23	2.38	2.11	100.0
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	60.00	90.00	6	6	100.0	319	318	99.7	80.00	370.70	1.17	2.14	100.0
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	70.00	160.00	6	5	83.3	322	315	97.8	70.00	211.00	2.04	2.94	100.0
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	20.00	30.00	6	4	66.7	322	237	73.6	20.00	51.10	1.55	3.44	89.2
PBUT	LEAD,UNFILT.TOTAL	ug/L	0	60.00	90.00	6	4	66.7	322	57	17.7	60.00	59.50	1.49	1.86	51.4
SEUT	SELENIUM,UNFILT.TOTAL	ug/L	0	30.00	30.00	6	2	33.3	308	5	1.6	20.00	17.30	1.43	2.07	5.4
COUT	COBALT,UNFILT.TOTAL	ug/L	0	10.00	10.00	6	1	16.7	322	82	25.5	10.00	9.30	1.00	2.31	83.8
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PMMCRE	M-CRESOL	ug/L	1	18.40	87.00	5	5	100.0	275	167	60.7	34.32	25.59	1.78	3.45	86.5
PMPHEN	PHENOL	ug/L	2	20.70	20.70	5	1	20.0	275	118	42.9	9.19	14.52	1.57	2.46	78.4
PESTICIDES,HERBICIDES,PCBS																
P24D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	0.05	0.53	5	4	80.0	276	214	77.5	0.13	0.13	3.93	3.72	100.0
P1BHCG	GAMMA-BHC(HEXCHLORCYCLHEXANE)	ug/L	2	0.03	0.04	5	3	60.0	276	143	51.8	0.02	0.02	2.05	2.29	94.6
P5SILV	SILVEX	ug/L	3	0.36	0.36	5	1	20.0	276	28	10.1	0.07	0.06	2.42	1.68	40.5
VOLATILES ORGANIC COMPOUNDS																
B2MPXY	M-, AND P-XYLENES	ug/L	1	79.00	79.00	5	1	20.0	274	43	15.7	26.32	26.00	1.85	2.02	37.8

PLANT NAME :Thunder Bay
PLANT TYPE :Primary

SAMPLING TYPE : Final Effluent
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	STD. FOR SURFACE WATER	STD. REF.	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET.	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																		
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0		-	94.60	139.00	5	5	100.0	40	40	100.0	108.11	48.40	1.17	2.05	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0		-	158.00	222.00	5	5	100.0	40	40	100.0	186.22	108.54	1.17	1.56	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0		-	10.30	11.20	5	5	100.0	40	40	100.0	10.67	12.80	1.04	1.40	100.0
NNHTPR	AMMONIUM,TOTAL FILT.REAC.	mg/L	0		-	11.30	14.20	5	5	100.0	40	40	100.0	12.71	10.46	1.09	1.66	100.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0		-	17.50	20.50	5	5	100.0	40	40	100.0	18.83	15.36	1.06	1.30	100.0
PH	(-LOG(H+(CONCN))		0		-	6.93	7.03	5	5	100.0	40	40	100.0	6.97	6.88	1.01	1.03	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0		-	53.00	111.00	5	5	100.0	39	39	100.0	77.58	29.57	1.31	1.73	100.0
RSPLOI	RESIDUE,PAR.LOSS ON IGNI.	mg/L	0		-	33.80	76.80	5	5	100.0	10	10	100.0	51.41	28.16	1.34	1.95	100.0
PHENOL	PHENOLICS (4AAP)	mg/L	0	0.00	ONT-MOE	0.15	0.15	5	1	20.0	40	7	17.5	0.06	0.06	1.63	2.01	57.1
METALS																		
CUUT	COPPER,UNFILT.TOTAL	ug/L	0	5.00	ONT-MOE	30.00	30.00	1	1	100.0	8	7	87.5	30.00	18.20	0.00	1.85	100.0
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	0.20	ONT-MOE	0.04	0.36	5	5	100.0	39	38	97.4	0.09	0.05	2.42	2.42	100.0
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	3750.00	ONT-MOE	60.00	70.00	6	6	100.0	48	47	97.9	70.00	304.90	1.07	2.83	100.0
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	30.00	ONT-MOE	40.00	70.00	6	6	100.0	48	48	100.0	50.00	69.80	1.25	3.04	100.0
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	75.00	ONT-MOE	150.00	470.00	6	5	83.3	48	46	95.8	210.00	550.00	1.69	3.45	100.0
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	100.00	ONT-MOE	10.00	10.00	6	3	50.0	48	29	60.4	10.00	10.80	1.43	1.94	85.7
AGUT	SILVER,UNFILT.TOTAL	ug/L	0	0.10	ONT-MOE	10.00	20.00	6	2	33.3	48	8	16.7	10.00	6.40	1.79	1.61	57.1
CDUT	CADMIUM,UNFILT.TOTAL	ug/L	0	0.20	ONT-MOE	10.00	10.00	6	2	33.3	48	18	37.5	0.00	2.50	1.93	1.96	85.7
COUT	COBALT,UNFILT.TOTAL	ug/L	0	5.00	NYS-STD	10.00	10.00	6	1	16.7	48	11	22.9	10.00	6.50	1.33	1.58	85.7
PBUT	LEAD,UNFILT.TOTAL	ug/L	0	25.00	ONT-MOE	50.00	50.00	6	1	16.7	48	9	18.8	20.00	20.80	1.86	1.94	71.4
SEUT	SELENIUM,UNFILT.TOTAL	ug/L	0	100.00	ONT-MOE	30.00	30.00	6	1	16.7	45	1	2.2	20.00	16.50	1.33	1.70	14.3
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																		
PM4CRE	M-CRESOL	ug/L	1		-	7.00	14.60	5	3	60.0	39	18	46.2	4.87	3.90	3.03	2.97	71.4
PMBBP	BUTYLBENZYLPHTHALATE	ug/L	1	50.00	NYS-GUL	2.10	2.10	5	1	20.0	39	8	20.5	1.16	1.42	1.39	2.10	57.1
PMPHEN	PHENOL	ug/L	2	1.00	ONT-MOE	4.10	4.10	5	1	20.0	39	5	12.8	1.83	1.78	1.57	1.60	42.9
PNFLUO	FLUORENE	ug/L	1	50.00	NYS-GUL	7.60	7.60	5	1	20.0	39	1	2.6	1.50	1.05	2.48	1.38	14.3
DIOXINS AND FURANS																		
P8OCDD	OCTACHLORODIBENZODIOXIN	ng/L	1	150.00	ONT-MOE	1.40	1.40	1	1	100.0	8	2	25.0	1.40	0.25	0.00	3.33	28.6
PESTICIDES,HERBICIDES,PCBS																		
P1BHCG	GAMMA-BHC(HEXCHLORCYCLOHEXANE)	ug/L	2	0.06	ONT-MOE	0.01	0.03	5	5	100.0	40	29	72.5	0.02	0.02	1.57	2.28	85.7
P24D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	4.00	ONT-MOE	0.07	0.15	5	5	100.0	40	27	67.5	0.12	0.06	1.38	4.96	85.7
P5SILV	SILVEX	ug/L	3		-	0.05	0.06	5	3	60.0	40	9	22.5	0.04	0.03	1.57	2.19	57.1
VOLATILES ORGANIC COMPOUNDS																		
X1TETR	TETRACHLOROETHYLENE	ug/L	1	0.70	NYS-GUL	4.70	8.20	5	2	40.0	38	21	55.3	2.08	4.39	2.77	5.84	85.7
B2MPXY	M-, AND P-XYLENES	ug/L	1	50.00	NYS-GUL	2.50	2.50	5	1	20.0	38	10	26.3	1.20	1.83	1.51	3.42	85.7
B2OXYL	O-XYLENE	ug/L	1	100.00	ONT-MOE	2.80	2.80	5	1	20.0	38	13	34.2	1.23	1.94	1.58	3.05	85.7

PLANT NAME : Thunder Bay
PLANT TYPE : Primary

SAMPLING TYPE : Raw Sludge
SAMPLE FORM : Dry Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS (DRY WEIGHT)	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
COD	CHEMICAL OXYGEN DEMAND	mg/kg	0	686480.19	686480.19	1	1	100.0	45	45	100.0	686480.19	892221.45	0.00	3.19	100.0
NNHTPR	AMMONIUM,TOTAL FILT.REAC.	mg/kg	0	4860.14	4860.14	1	1	100.0	48	47	97.9	4860.14	5911.32	0.00	4.59	100.0
NNOTPR	NITRATES,TOTAL FILT.REAC.	mg/kg	0	21.56	21.56	1	1	100.0	48	43	89.6	21.56	25.44	0.00	2.21	93.9
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/kg	0	22727.27	22727.27	1	1	100.0	51	51	100.0	22727.27	36897.85	0.00	2.98	100.0
PH	(-LOG(H+(CONCN))	mg/kg	0	6.48	6.48	1	1	100.0	49	49	100.0	6.48	6.03	0.00	1.10	100.0
PHNOL	PHENOLICS (4AAP)	mg/kg	0	16.32	16.32	1	1	100.0	50	41	82.0	16.32	82.34	0.00	3.54	85.3
RST	RESIDUE, TOTAL	mg/kg	0	85800.00	85800.00	1	1	100.0	51	51	100.0	85800.00	32783.51	0.00	1.81	100.0
RST1.0I	RESIDUE,TOT.LOSS ON IGNI.	mg/kg	0	46800.00	46800.00	1	1	100.0	51	51	100.0	46800.00	20803.05	0.00	1.77	100.0
METALS																
AGUT	SILVER,UNFILT.TOTAL	mg/kg	0	16.32	16.32	1	1	100.0	45	40	88.9	16.32	30.17	0.00	2.61	84.4
ALUT	ALUMINUM,UNFILT.TOTAL	mg/kg	0	6759.91	6759.91	1	1	100.0	51	51	100.0	6759.91	9835.74	0.00	2.51	100.0
ASUT	ARSENIC,UNFILT.TOTAL	mg/kg	0	13.40	13.40	1	1	100.0	51	50	98.0	13.40	6.13	0.00	2.01	97.1
CDUT	CADMIUM,UNFILT.TOTAL	mg/kg	0	2.45	2.45	1	1	100.0	43	40	93.0	2.45	9.74	0.00	4.35	90.0
COUT	COBALT,UNFILT.TOTAL	mg/kg	0	31.47	31.47	1	1	100.0	41	30	73.2	31.47	9.28	0.00	4.69	73.3
CRUT	CHROMIUM,UNFILT.TOTAL	mg/kg	0	163.17	163.17	1	1	100.0	51	50	98.0	163.17	301.43	0.00	3.68	97.1
CUUT	COPPER,UNFILT.TOTAL	mg/kg	0	338.00	338.00	1	1	100.0	46	46	100.0	338.00	608.31	0.00	1.72	100.0
HGUT	MERCURY,UNFILT.TOTAL	mg/kg	0	2.45	2.45	1	1	100.0	50	50	100.0	2.45	2.23	0.00	1.67	100.0
MOUT	MOLYBDENUM,UNFILT.TOTAL	mg/kg	0	256.41	256.41	1	1	100.0	37	23	62.2	256.41	5.80	0.00	2.88	64.3
NIUT	NICKEL,UNFILT.TOTAL	mg/kg	0	20.98	20.98	1	1	100.0	46	44	95.7	20.98	59.17	0.00	2.90	93.3
PBUT	LEAD,UNFILT.TOTAL	mg/kg	0	221.45	221.45	1	1	100.0	49	48	98.0	221.45	173.99	0.00	2.24	96.9
SEUT	SELENIUM,UNFILT.TOTAL	mg/kg	0	2.10	2.10	1	1	100.0	50	48	96.0	2.10	3.04	0.00	1.93	93.9
SRUT	STRONTIUM,UNFILT.TOTAL	mg/kg	0	36.13	36.13	1	1	100.0	51	51	100.0	36.13	231.70	0.00	1.97	100.0
ZNUT	ZINC,UNFILT.TOTAL	mg/kg	0	361.31	361.31	1	1	100.0	51	51	100.0	361.31	905.39	0.00	2.39	100.0
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PMMCRE	M-CRESOL	ug/kg	1	118881.10	118881.10	1	1	100.0	51	42	82.3	118881.10	116847.30	0.00	12.16	85.3
PMPHEN	PHENOL	ug/kg	2	22144.50	22144.50	1	1	100.0	51	15	29.4	22144.50	7312.80	0.00	3.00	38.2
DIOXINS AND FURANS																
P96CDD	OCTACHLORODIBENZODIOXIN	ug/kg	1	6.30	6.30	1	1	100.0	50	25	50.0	6.30	8.50	0.00	3.60	58.8
PESTICIDES,HERBICIDES,PCBS																
P1BHCA	ALPHA-BHC(HEXCHLORCYCLOHEXANE)	ug/kg	1	2.30	2.30	1	1	100.0	51	12	23.5	2.30	5.50	0.00	2.74	35.3
P1BHCB	BETA-BHC (HEXCHLORCYCLOHEXANE)	ug/kg	1	2.30	2.30	1	1	100.0	51	18	35.3	2.30	7.40	0.00	3.29	38.2
P1BHCG	GAMMA-BHC(HEXCHLORCYCLOHEXANE)	ug/kg	2	4.70	4.70	1	1	100.0	51	28	54.9	4.70	8.90	0.00	2.69	67.7
P1CHLA	ALPHA-CHLORDANE	ug/kg	1	2.30	2.30	1	1	100.0	51	18	35.3	2.30	5.90	0.00	2.38	47.1
P1DIEL	DIELDRIN	ug/kg	2	5.80	5.80	1	1	100.0	51	20	39.2	5.80	7.20	0.00	3.10	50.0
P1HPE	HEPTACHLOREPOXIDE	ug/kg	2	3.50	3.50	1	1	100.0	51	12	23.5	3.50	5.00	0.00	2.62	32.4
P1PPDD	PP-DDD	ug/kg	1	2.30	2.30	1	1	100.0	51	13	25.5	2.30	5.10	0.00	2.48	35.3
P1PPDE	PP-DDE	ug/kg	1	4.70	4.70	1	1	100.0	51	22	43.1	4.70	7.30	0.00	2.31	52.9
P35HEV	SILVEX	ug/kg	3	116.60	116.60	1	1	100.0	51	23	45.1	116.60	47.30	0.00	3.40	55.9
X2HCB	HEXACHLOROBENZENE	ug/kg	2	2.30	2.30	1	1	100.0	51	17	33.3	2.30	5.60	0.00	2.65	38.2

PLANT NAME : Thunder Bay | **SAMPLING TYPE : Treated Sludge**
PLANT TYPE : Primary | **SAMPLE FORM : Dry Weight**

CONTAM-INANT	CONTAMINANT NAME	UNITS (DRY WEIGHT)	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
COD	CHEMICAL OXYGEN DEMAND	mg/kg	0	676190.48	676190.48	1	1	100.0	36	36	100.0	676190.48	508097.94	0.00	4.65	100.0
NH3TPR	AMMONIUM,TOTAL FIL.T.REAC.	mg/kg	0	8500.00	8500.00	1	1	100.0	25	25	100.0	8500.00	17658.28	0.00	2.92	100.0
NNOTPR	NITRATE-S,TOTAL FIL.T.REAC.	mg/kg	0	20.24	20.24	1	1	100.0	26	23	88.5	20.24	42.68	0.00	2.29	95.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/kg	0	25595.24	25595.24	1	1	100.0	49	49	100.0	25595.24	38494.12	0.00	1.77	100.0
PH	(-1.00(H+(CONCN))	mg/kg	0	7.39	7.39	1	1	100.0	47	47	100.0	7.39	7.17	0.00	1.09	100.0
PHNOL	PHENOLICS (4AAP)	mg/kg	0	17.86	17.86	1	1	100.0	49	41	83.7	17.86	43.05	0.00	3.14	97.9
RST	RESIDUE, TOTAL	mg/kg	0	84000.00	84000.00	1	1	100.0	50	50	100.0	84000.00	80434.06	0.00	3.23	100.0
RSTLOI	RESIDUE,TOT.LOSS ON IGNI.	mg/kg	0	37700.00	37700.00	1	1	100.0	50	50	100.0	37700.00	43379.33	0.00	3.19	100.0
METALS																
AGUT	SILVER,UNFIL.T.TOTAL	mg/kg	0	19.05	19.05	1	1	100.0	44	44	100.0	19.05	37.78	0.00	2.33	100.0
ALUT	ALUMINUM,UNFIL.T.TOTAL	mg/kg	0	5476.19	5476.19	1	1	100.0	50	50	100.0	5476.19	10715.94	0.00	2.82	100.0
ASUT	ARSENIC,UNFIL.T.TOTAL	mg/kg	0	4.76	4.76	1	1	100.0	50	49	98.0	4.76	5.40	0.00	2.06	97.1
CDUT	CADMIUM,UNFIL.T.TOTAL	mg/kg	0	2.62	2.62	1	1	100.0	45	41	91.1	2.62	10.47	0.00	3.98	90.3
COUT	COBALT,UNFIL.T.TOTAL	mg/kg	0	35.71	35.71	1	1	100.0	39	32	82.1	35.71	9.14	0.00	2.75	85.7
CRUT	CHROMIUM,UNFIL.T.TOTAL	mg/kg	0	250.00	250.00	1	1	100.0	50	50	100.0	250.00	333.06	0.00	3.59	100.0
CUUT	COPPER,UNFIL.T.TOTAL	mg/kg	0	464.29	464.29	1	1	100.0	45	45	100.0	464.29	732.24	0.00	2.16	100.0
HGUT	MERCURY,UNFIL.T.TOTAL	mg/kg	0	1.90	1.90	1	1	100.0	50	49	98.0	1.90	3.24	0.00	2.04	97.1
MOUT	MOLYBDENUM,UNFIL.T.TOTAL	mg/kg	0	83.33	83.33	1	1	100.0	34	23	67.7	83.33	6.41	0.00	2.84	69.2
NIUT	NICKEL,UNFIL.T.TOTAL	mg/kg	0	20.24	20.24	1	1	100.0	45	42	93.3	20.24	72.95	0.00	2.95	90.0
PBUT	LEAD,UNFIL.T.TOTAL	mg/kg	0	178.57	178.57	1	1	100.0	50	49	98.0	178.57	196.62	0.00	2.46	97.1
SEUT	SELENIUM,UNFIL.T.TOTAL	mg/kg	0	1.43	1.43	1	1	100.0	50	48	96.0	1.43	2.67	0.00	2.98	97.1
SRUT	STRONTIUM,UNFIL.T.TOTAL	mg/kg	0	35.71	35.71	1	1	100.0	50	50	100.0	35.71	240.93	0.00	2.54	100.0
ZNUT	ZINC,UNFIL.T.TOTAL	mg/kg	0	369.05	369.05	1	1	100.0	50	50	100.0	369.05	988.90	0.00	2.57	100.0
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PMBBP	BUTYLBENZYLPHTHALATE	ug/kg	1	10214.30	10214.30	1	1	100.0	50	8	16.0	10214.30	1916.90	0.00	5.23	17.7
PMMCRS	M-CRESOL	ug/kg	1	17857.10	17857.10	1	1	100.0	50	15	30.0	17857.10	5281.80	0.00	8.20	35.3
PESTICIDES,HERBICIDES,PCBS																
P1PPDE	PP-DDE	ug/kg	1	3.60	3.60	1	1	100.0	50	34	68.0	3.60	11.10	0.00	2.72	73.5
P524D	2,4-DICHLOROPHENOXYACETIC ACID	ug/kg	3	58.30	58.30	1	1	100.0	50	25	50.0	58.30	75.00	0.00	5.81	64.7
P3SH.V	SILVEX	ug/kg	3	166.70	166.70	1	1	100.0	50	18	36.0	166.70	92.70	0.00	2.94	44.1
X2HCB	HEXACHLOROBENZENE	ug/kg	2	3.60	3.60	1	1	100.0	50	21	42.0	3.60	7.00	0.00	2.96	55.9

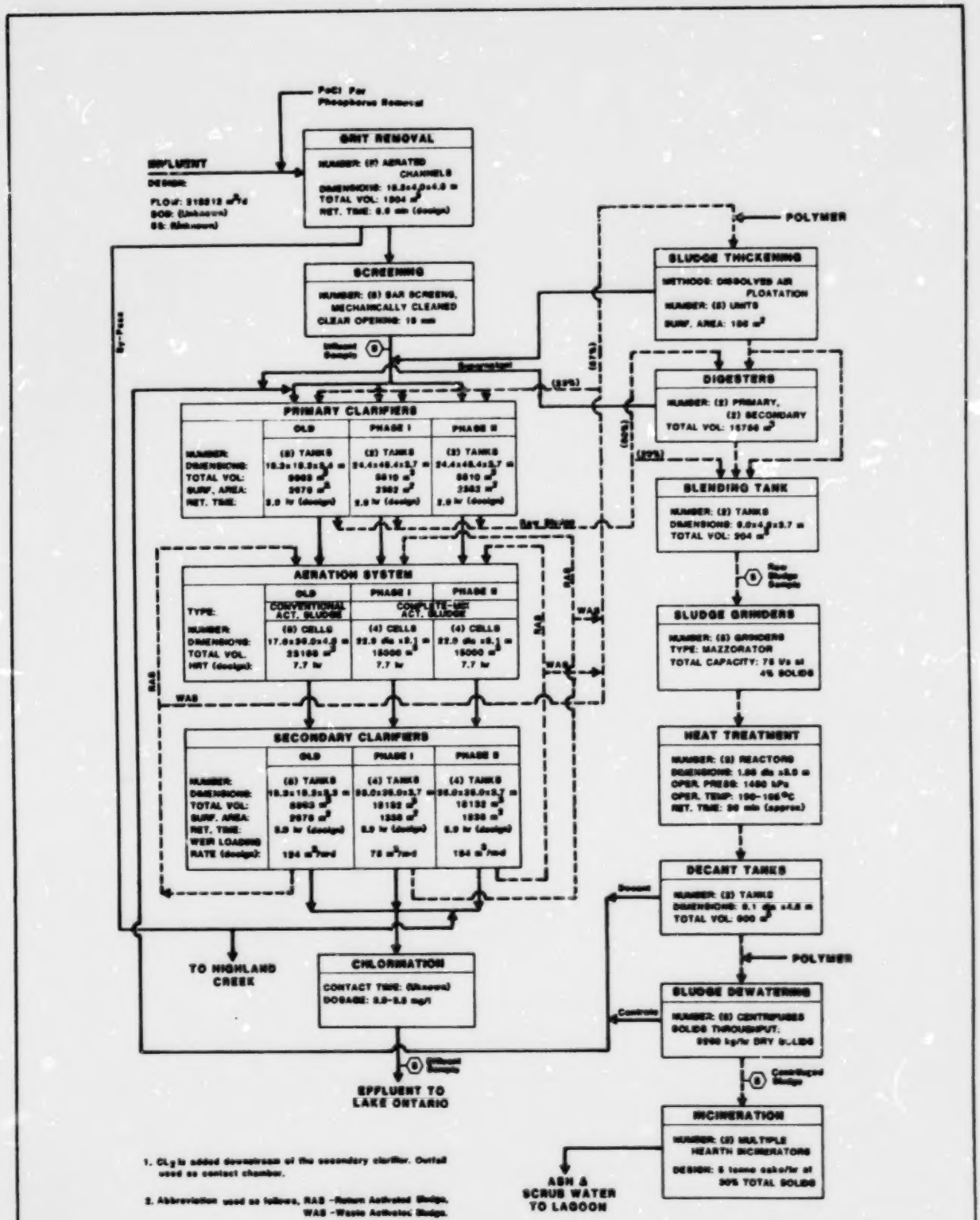
Sub-Appendix A-29

Toronto (Highland Creek) WPCP

Contents:

- Plant Schematic with Design Characteristics
- Annual Data Review (1981 - 1986 Plant Performance)
- Sources of Municipal Water Pollution Control Plant Raw Sewage
- Operational Evaluation for Toronto (Highland Creek) WPCP
- Analytical Data

(KIR18/28A)



1. Cl_2 is added downstream of the secondary clarifier. Outfall used as contact chamber.

2. Abbreviation used as follows, RAS -Return Activated Sludge, WAS -Waste Activated Sludge.

TORONTO (HIGHLAND CREEK) WPCP

CANVIRO

HIGHLAND CREEK WPCP (SCARBOROUGH)
Conventional-Activated Sludge
Phosphorus Removal - Continuous
Capacity - 218.200 10(3)m3/day

PARAMETER	1981	1982	1983	1984	1985	5 YEAR AVERAGE 81-85
Avg. Daily Flow (1000 m3/day)	153.20	162.29	162.75	156.89	163.29	159.68
BOD5 - Influent (mg/L)	185.00	195.60	167.00	204.92	181.25	186.75
BOD5 - Effluent (mg/L)	22.60	18.10	19.00	33.92	18.83	22.65
Annual BOD5 Significantly Different from Mean Annual Average BOD5?	I.D.	I.D.	I.D.	I.D.	I.D.	
TSS - Influent (mg/L)	213.60	232.50	269.00	332.42	285.83	250.67
TSS - Effluent (mg/L)	16.00	11.00	18.00	24.50	16.50	17.52
Annual TSS Significantly Different from Mean Annual Average TSS?	I.D.	I.D.	I.D.	I.D.	I.D.	
Total P - Influent (mg/L)	6.10	5.90	5.31	5.61	5.46	5.68
Total P - Effluent (mg/L)	1.00	1.04	1.05	0.91	0.77	0.95
Annual TP Significantly Different from Mean Annual Average TP?	I.D.	I.D.	I.D.	I.D.	I.D.	
TP in Compliance?	Y	N	N	Y	Y	Y

I.D. - Insufficient Data

R

SOURCES OF MUNICIPAL WATER POLLUTION CONTROL PLANT RAW SEWAGE

GENERAL DESCRIPTION OF WATER POLLUTION CONTROL PLANT (WPCP)

NAME OF WPCP	HIGHLAND CREEK WPCP
WORKS NUMBER	120000373
TREATMENT TYPE	CONVENTIONAL ACTIVATED SLUDGE PHOSPHORUS REMOVAL CONTINUOUS
DESIGN CAPACITY (1000 m3/d)	218.208
1986 AVERAGE DAY FLOW (1000 m3/d)	172.200
POPULATION SERVED	123000

% OF TOTAL FLOW ATTRIBUTED TO:

INDUSTRIAL SOURCES (%)	22
COMMERCIAL SOURCES (%) (Population x 0.0757)	5
RESIDENTIAL SOURCES (%) (Population x 0.175)	13
UNACCOUNTED FOR, INCL. INFILTRATION (100-% Contributed from industrial, commercial and residential sources)	60

PROFILE OF INDUSTRIES IN CATCHMENT

TOTAL NO OF INDUSTRIES	874
INDUSTRIES WITH WATER	539
NO OF SIC CATEGORIES	54

DESCRIPTION OF THE TOP 5 INDUSTRIES DISCHARGED TO THE WPCP (BASED ON WATER USE DATA)

DESCRIPTION	SIC	# OF COMPANIES
MISC. CONVERTED PAPER PRODUCTS	2640-2655	37
ELECTRICAL & ELECTRONIC COMPONENTS	3612-3690	80
MACHINERY MFG	3500-3599	165
PRINTING AND PUBLISHING	2700-2799	134
FRUIT AND VEGETABLES	2032-2038	7

OPERATIONAL EVALUATION FOR: TORONTO HIGHLAND CREEK WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: March 20, 1987
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: 218,212 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
RAW SEWAGE FLOW	162,300	162,200	156,200	163,300	176,600	178,500	181,800
% of Design Flow	74.38%	74.33%	71.58%	74.84%	80.93%	81.80%	83.31%
Influent BOD (mg/L)	140.0	140.0	175.0	140.0			130.0
Primary BOD (mg/L)	180.0	205.0	190.0	150.0			150.0
Secondary BOD (mg/L)	16.0	7.0	7.0	7.0			8.0
% PRIMARY REMOVAL	-28.6%	-46.4%	-8.6%	-7.1%			-15.4%
% SECONDARY REMOVAL	88.6%	95.0%	96.0%	95.0%			93.8%
Influent SS (mg/L)	145.0	185.0	150.0	145.0	190.0	190.0	140.0
Primary SS (mg/L)	215.0	145.0	170.0	170.0	225.0	225.0	175.0
Secondary SS (mg/L)	27.0	12.0	14.0	11.0	12.0	12.0	14.0
% PRIMARY REMOVAL	-48.3%	21.6%	-13.3%	-17.2%	-18.4%	-18.4%	-25.0%
% SECONDARY REMOVAL	81.4%	93.5%	90.7%	92.4%	93.7%	93.7%	90.0%
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)	11.2	9.0	12.8	12.0			15.0
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)	21.4	24.5	24.2	25.6			25.8
Primary TKN (mg/L)							
Secondary TKN (mg/L)	16.6	15.8	17.8	17.9			17.9
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	22.4%	35.5%	26.4%	30.1%			30.6%
Influent Total P (mg/L)	4.00	4.50	4.60	4.70	4.70	5.10	4.20
Primary Total P (mg/L)							
Secondary Total P (mg/L)	0.80	0.40	0.40	0.40	0.50	0.60	0.60
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	80.0%	91.1%	91.3%	91.5%	89.4%	88.2%	85.7%

NOTE : "Secondary NH4" is actually Ammonia as N (mg/L)

OPERATIONAL EVALUATION FOR: TORONTO HIGHLAND CREEK WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: March 20, 1987
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: 218,212 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 8	DAY 9	DAY 10	DAY 11	DAY 12	DAY 13	DAY 14
RAW SEWAGE FLOW	160,000	176,300	161,000	160,900	162,800	164,500	162,800
% of Design Flow	73.32%	80.79%	73.78%	73.74%	74.61%	75.39%	74.61%
Influent BOD (mg/L)	130.0	140.0	150.0	130.0			130.0
Primary BOD (mg/L)	190.0	175.0	215.0	235.0			160.0
Secondary BOD (mg/L)	7.0	6.0	9.0	17.0			11.0
% PRIMARY REMOVAL	-46.2%	-25.0%	-43.3%	-80.8%			-23.1%
% SECONDARY REMOVAL	94.6%	95.7%	94.0%	86.9%			91.5%
Influent SS (mg/L)	160.0	185.0	160.0	165.0	165.0	165.0	165.0
Primary SS (mg/L)	140.0	175.0	245.0	275.0	170.0	170.0	135.0
Secondary SS (mg/L)	12.0	11.0	10.0	9.0	10.0	10.0	11.0
% PRIMARY REMOVAL	12.5%	5.4%	-53.1%	-66.7%	-3.0%	-3.0%	18.2%
% SECONDARY REMOVAL	92.5%	94.1%	93.7%	94.5%	93.9%	93.9%	93.3%
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)	15.5	15.0	14.4	16.3			16.6
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)	27.7	25.1	25.6	26.9			30.7
Primary TKN (mg/L)							
Secondary TKN (mg/L)	20.5	17.6	17.6	20.2			23.0
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	26.0%	29.9%	31.2%	24.9%			25.1%
Influent Total P (mg/L)	4.4	4.3	4.5	4.4	4.9	4.9	4.4
Primary Total P (mg/L)							
Secondary Total P (mg/L)	0.6	0.4	0.4	0.5	0.5	0.6	0.7
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	86.4%	90.7%	91.1%	88.6%	89.8%	87.8%	84.1%

NOTE : "Secondary NH4" is actually Ammonia as N (mg/L)

OPERATIONAL EVALUATION FOR: TORONTO HIGHLAND CREEK WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: March 20, 1987
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: 218,212 m3/d

PARAMETER	SAMPLING PERIOD DAY 15	DAY 16	DAY 17	DAY 18	DAY 19	DAY 20	DAY 21
RAW SEWAGE FLOW	158,500	157,400	162,500	161,500	161,800		
% of Design Flow	72.64%	72.13%	74.47%	74.01%	74.15%		
Influent BOD (mg/L)	135.0	145.0	150.0	135.0			
Primary BOD (mg/L)	165.0	220.0	230.0	225.0			
Secondary BOD (mg/L)	10.0	9.0	8.0	9.0			
% PRIMARY REMOVAL	-22.2%	-51.7%	-53.3%	-66.7%			
% SECONDARY REMOVAL	92.6%	93.8%	94.7%	93.3%			
Influent SS (mg/L)	165.0	155.0	170.0	160.0	225.0		
Primary SS (mg/L)	155.0	450.0	275.0	385.0	255.0		
Secondary SS (mg/L)	8.0	10.0	14.0	13.0	16.0		
% PRIMARY REMOVAL	6.1%	-190.3%	-61.8%	-140.6%	-13.3%		
% SECONDARY REMOVAL	95.2%	93.5%	91.8%	91.9%	92.9%		
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)	17.1	17.9	16.0	15.4			
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)	26.9	28.3	28.2	28.1			
Primary TKN (mg/L)							
Secondary TKN (mg/L)	20.5	22.1	18.6	19.2			
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	23.8%	21.9%	34.0%	31.7%			
Influent Total P (mg/L)	5.10	4.90	4.70	4.70	6.10		
Primary Total P (mg/L)							
Secondary Total P (mg/L)	0.50	0.50	0.40	0.40	0.40		
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	90.2%	89.8%	91.5%	91.5%	93.4%		

NOTE : "Secondary NH4" is actually Ammonia as N (mg/L)

OPERATIONAL EVALUATION FOR: TORONTO HIGHLAND CREEK WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: July 5,1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 218,212 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
RAW SEWAGE FLOW	201,900	200,900	202,300	203,400	207,000	200,700	196,400
% of Design Flow	92.52%	92.07%	92.71%	93.21%	94.86%	91.97%	90.00%
Influent BOD (mg/L)	175	140	195	180			
Primary BOD (mg/L)	190	180	185	195			
Secondary BOD (mg/L)	9	6	6	7			
% PRIMARY REMOVAL	-8.6	-28.6	5.1	-8.3			
% SECONDARY REMOVAL	94.9	95.7	96.9	96.1			
Influent SS (mg/L)	260	200	255	305	190	190	230
Primary SS (mg/L)	205	270	250	170	235	235	200
Secondary SS (mg/L)	16	12	11	12	10	10	11
% PRIMARY REMOVAL	21.2	-35.0	2.0	44.3	-23.7	-23.7	13.0
% SECONDARY REMOVAL	93.8	94.0	95.7	96.1	94.7	94.7	95.2
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)	21.8	14.1	17.3	19.2			15.0
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)	33.3	25.6	30.1	31.8			29.1
Primary TKN (mg/L)							
Secondary TKN (mg/L)	25.6	21.1	19.8	20.5			22.1
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	23.1	17.6	34.2	35.5			24.1
Influent Total P (mg/L)	5.5	4.8	5.0	5.4	6.0	5.1	4.7
Primary Total P (mg/L)							
Secondary Total P (mg/L)	0.70	0.44	0.46	0.44	0.46	0.56	0.52
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	87.3	90.8	90.8	91.9	92.3	89.0	88.9

NOTE: "Secondary NH4" is actually "Ammonia as N (mg/L)".

OPERATIONAL EVALUATION FOR: H I G H L A N D C R E E K W P C P

TREATMENT FACILITY: Secondary
PERIOD ENDING: July 5,1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 218,212 m3/d

PARAMETER	PRE-SAMPLING PERIOD DAY 8	DAY 9	DAY 10	DAY 11	DAY 12	DAY 13	DAY 14
RAW SEWAGE FLOW	209,100	207,100	216,900	218,200	218,200	197,600	188,600
% of Design Flow	95.82%	94.91%	99.40%	99.99%	99.99%	90.55%	86.43%
Influent BOD (mg/L)	160	150	165	225			255
Primary BOD (mg/L)	165	165	155	295			295
Secondary BOD (mg/L)	7	7	7	12			14
% PRIMARY REMOVAL	-3.1	-10.0	6.1	-31.1			-15.7
% SECONDARY REMOVAL	95.6	95.3	95.8	94.7			94.5
Influent SS (mg/L)	215	175	245	240	185	185	185
Primary SS (mg/L)	170	150	180	480	200	200	180
Secondary SS (mg/L)	13	11	14	13	13	13	13
% PRIMARY REMOVAL	20.9	14.3	26.5	-100.0	-8.1	-8.1	2.7
% SECONDARY REMOVAL	94.0	93.7	94.3	94.6	93.0	93.0	93.0
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)	19.8	17.9	17.9	14.7			19.2
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)	28.5	27.5	28.2	26.2			32.0
Primary TKN (mg/L)							
Secondary TKN (mg/L)	24.0	22.4	20.5	21.0			26.9
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	15.8	18.5	27.3	19.8			15.9
Influent Total P (mg/L)	4.8	4.4	4.8	5.5	4.9	4.9	5.8
Primary Total P (mg/L)							
Secondary Total P (mg/L)	0.60	0.54	0.66	0.90	0.90	1.06	1.10
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	87.5	87.7	86.3	83.6	81.6	78.4	81.0

NOTE: "Secondary NH4" is actually "Ammonia as N (mg/L)".

OPERATIONAL EVALUATION FOR: TORONTO HIGHLAND CREEK WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: July 5,1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 218,212 m3/d

PARAMETER	SAMPLING PERIOD DAY 15	DAY 16	DAY 17	DAY 18	DAY 19	DAY 20	DAY 21
RAW SEWAGE FLOW	199,900	201,400	201,900	194,400	198,900	191,100	188,800
% of Design Flow	91.61%	92.30%	92.52%	89.09%	91.15%	87.58%	86.52%
Influent BOD (mg/L)	150						
Primary BOD (mg/L)	150						
Secondary BOD (mg/L)	16						
% PRIMARY REMOVAL	0.0						
% SECONDARY REMOVAL	89.3						
Influent SS (mg/L)	215	219	190	195	310	190	190
Primary SS (mg/L)	170	200	185	225	285	285	430
Secondary SS (mg/L)	15	12	14	15	8	8	8
% PRIMARY REMOVAL	20.9	8.7	2.6	-15.4	8.1	-50.0	-126.3
% SECONDARY REMOVAL	93.0	94.5	92.6	92.3	97.4	95.8	95.8
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)	16.0	19.2					20.5
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)	32.0		25.3	26.2			33.3
Primary TKN (mg/L)							
Secondary TKN (mg/L)	25.0		23.7	20.1			26.2
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	21.9		6.3	23.3			21.3
Influent Total P (mg/L)	5.6	5.1	5.1	4.7	5.0	4.5	4.6
Primary Total P (mg/L)							
Secondary Total P (mg/L)	1.20	1.20	1.10	0.84	0.72	0.72	0.76
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	78.6	76.5	78.4	82.1	85.6	84.0	83.5

NOTE: "Secondary NH4" is actually "Ammonia as N (mg/L)".

PLANT NAME : Toronto (Highland Creek)
PLANT TYPE : Secondary

SAMPLING TYPE : Raw Sewage
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	PLANT MIN. CONC. > = DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0	133.00	232.00	11	11	100.0	267	266	99.6	172.29	140.23	1.21	1.93	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0	186.00	438.00	11	11	100.0	260	258	99.2	339.14	287.75	1.27	1.82	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0	24.00	65.00	11	11	100.0	271	271	100.0	31.90	22.39	1.39	1.81	100.0
NNHTPR	AMMONIUM,TOTAL FILT.REAC.	mg/L	0	15.50	20.40	11	11	100.0	275	274	99.6	17.44	15.37	1.09	1.69	100.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0	24.70	31.80	11	11	100.0	273	273	100.0	27.23	25.44	1.09	1.47	100.0
PH	(-LOG(H+(CONCN))		0	6.54	7.16	11	11	100.0	275	275	100.0	6.83	6.90	1.03	1.05	100.0
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/L	0	4.78	6.05	12	12	100.0	248	248	100.0	5.31	5.18	1.10	1.51	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0	93.40	434.00	11	11	100.0	267	266	99.6	162.05	126.88	1.49	1.93	100.0
RSPLOI	RESIDUE,PAR.LOSS ON IGNI.	mg/L	0	63.60	114.00	7	7	100.0	90	89	98.9	89.05	100.84	1.21	1.78	100.0
NNO2PR	NITRITE,FILT. REACT.	mg/L	0	0.03	0.11	11	7	63.6	271	58	21.4	0.02	0.01	4.67	2.98	51.4
NNOTPR	NITRATES,TOTAL FILT.REAC.	mg/L	0	0.25	0.30	11	4	36.4	275	28	10.2	0.09	0.05	2.76	2.33	32.4
PHNOL	PHENOLICS (4AAP)	mg/L	0	0.80	11.00	11	2	18.2	275	37	13.5	0.39	0.31	3.19	2.05	37.8
METALS																
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	870.00	3200.00	13	13	100.0	322	306	95.0	1580.00	1000.10	1.43	2.65	97.3
CCNFUR	CYANIDE-FREE,UNFILT.REAC.	ug/L	0	10.00	19000.00	8	8	100.0	271	82	30.3	40.00	1.90	12.43	6.88	32.4
CUUT	COPPER,UNFILT.TOTAL	ug/L	0	280.00	340.00	2	2	100.0	49	48	98.0	310.00	110.60	1.15	2.28	97.1
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	0.17	0.45	11	11	100.0	283	274	96.8	0.25	0.23	1.35	2.11	100.0
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	200.00	260.00	13	13	100.0	319	318	99.7	220.00	370.70	1.09	2.14	100.0
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	200.00	590.00	13	13	100.0	322	315	97.8	350.00	211.00	1.34	2.94	100.0
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	20.00	150.00	13	12	92.3	322	237	73.6	50.00	51.10	1.72	3.44	89.2
NIUT	NICKEL,UNFILT.TOTAL	ug/L	0	30.00	140.00	13	6	46.2	322	105	32.0	40.00	38.80	1.74	2.70	54.1
AGUT	SILVER,UNFILT.TOTAL	ug/L	0	10.00	20.00	13	5	38.5	321	82	25.6	10.00	10.40	2.57	2.55	75.7
COUT	COBALT,UNFILT.TOTAL	ug/L	0	10.00	40.00	13	4	30.8	322	82	25.5	10.00	9.30	2.08	2.31	83.8
CDUT	CADMIUM,UNFILT.TOTAL	ug/L	0	10.00	10.00	13	2	15.4	322	76	23.6	10.00	6.50	1.45	2.09	70.3
PBUT	LEAD,UNFILT.TOTAL	ug/L	0	90.00	120.00	13	2	15.4	322	57	17.7	50.00	59.50	1.44	1.86	51.4
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PMMCRE	M-CRESOL	ug/L	1	17.70	236.70	11	11	100.0	275	167	60.7	40.30	25.59	2.24	3.45	86.5
PMPHEN	PHENOL	ug/L	2	21.30	53.50	11	4	36.4	275	118	42.9	12.56	14.52	2.12	2.46	78.4
PMDMP	DIMETHYL PHTHALATE	ug/L	1	10.60	15.70	11	3	27.3	275	4	1.5	6.40	5.10	1.54	1.37	5.4
X3PCPH	PENTACHLOROPHENOL	ug/L	1	106.20	120.80	11	2	18.2	275	5	1.8	18.66	12.94	2.44	1.42	10.8
PMBBP	BUTYLBENZYLPHTHALATE	ug/L	1	13.40	13.40	11	1	9.1	275	34	12.4	5.47	5.85	1.35	1.66	37.8
PESTICIDES,HERBICIDES,PCBS																
P324D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	0.05	0.34	11	9	81.8	276	214	77.5	0.10	0.13	2.67	3.72	100.0
P1BHCB	BETA-BHC (HEXCHLORCYCLHEXANE)	ug/L	1	0.04	0.04	11	2	18.2	276	32	11.6	0.01	0.01	1.75	1.66	35.1
P1DMDT	METHOXYCHLOR	ug/L	1	1.60	1.80	11	2	18.2	276	47	17.0	0.09	0.08	4.16	3.14	43.2
P1BHCG	GAMMA-BHC(HEXCHLORCYCLHEXANE)	ug/L	2	0.03	0.03	11	1	9.1	276	143	51.8	0.01	0.02	1.39	2.29	94.6
P1END2	ENDOSULFAN II	ug/L	3	0.03	0.03	11	1	9.1	276	10	3.6	0.01	0.01	1.39	1.42	21.6
P1ENDR	ENDRIN	ug/L	3	0.04	0.04	11	1	9.1	276	5	1.8	0.01	0.01	1.52	1.34	10.8
P1PCBT	PCB, TOTAL	ug/L	2	0.21	0.21	11	1	9.1	276	42	15.2	0.05	0.06	1.65	2.31	46.0
P345ST	2,4,5-TRICLORPHENOXYACETIC ACID	ug/L	3	0.10	0.10	11	1	9.1	276	22	8.0	0.05	0.06	1.23	1.60	37.8
X2HCE	HEXACHLOROETHANE	ug/L	3	0.02	0.02	11	1	9.1	276	5	1.8	0.01	0.01	1.23	1.26	13.5

PLANT NAME : Toronto (Highland Creek)
PLANT TYPE : Secondary

SAMPLING TYPE : Raw Sewage
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
VOLATILES ORGANIC COMPOUNDS																
X1111T	1,1,1-TRICHLOROETHANE	ug/L	1	127.00	440.00	12	7	58.3	274	21	7.7	91.34	25.18	4.01	1.74	18.9
B2EBNZ	ETHYLBENZENE	ug/L	1	53.00	53.00	12	1	8.3	274	30	11.0	21.69	23.50	1.32	1.75	29.7
B2M2PXY	M-, AND P-XYLENES	ug/L	1	83.00	83.00	12	1	8.3	274	43	15.7	22.52	26.00	1.51	2.02	37.8
X1CHLO	CHLOROFORM	ug/L	1	59.00	59.00	12	1	8.3	274	28	10.2	21.89	23.90	1.37	1.75	32.4
X1TRIC	TRICHLOROETHYLENE	ug/L	1	9800.00	9800.00	12	1	8.3	274	15	5.5	35.51	22.59	5.98	1.82	16.2

PLANT NAME: Toronto (Highland Creek) **SAMPLING TYPE : Final Effluent**
PLANT TYPE : Secondary **SAMPLE FORM : Wet Weight**

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	STD. FOR SURFACE WATER	STD. REF.	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET.	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																		
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0		-	11.10	65.90	12	12	100.0	213	211	99.1	28.44	21.22	1.80	2.07	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0		-	62.00	116.00	12	12	100.0	213	211	99.1	78.28	52.80	1.21	1.83	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0		-	12.30	33.20	12	12	100.0	220	220	100.0	16.22	8.09	1.34	1.60	100.0
NNHTPR	AMMONIUM,TOTAL FILT.REAC.	mg/L	0		-	16.30	20.80	12	12	100.0	223	204	91.5	19.03	3.90	1.07	6.98	100.0
NNO2PR	NITRITE,FILT. REACT.	mg/L	0		-	0.16	1.86	12	12	100.0	220	194	88.2	0.41	0.22	2.11	5.95	96.4
NNO3PR	NITRATES,TOTAL FILT.REAC.	mg/L	0		-	1.05	5.20	12	12	100.0	224	186	83.0	1.92	2.33	1.64	7.75	96.4
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0		-	21.40	25.30	12	12	100.0	222	222	100.0	23.63	7.97	1.05	2.71	100.0
PH	(-LOG(H+(CONCN))		0		-	6.74	7.14	12	12	100.0	224	224	100.0	6.93	7.10	1.02	1.05	100.0
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/L	0		-	0.46	1.50	13	13	100.0	211	206	97.6	0.82	0.68	1.43	1.97	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0		-	12.60	26.50	12	12	100.0	220	219	99.6	17.10	10.12	1.22	2.00	100.0
RSFLOI	RESIDUE,PAR.LOSS ON IGNI.	mg/L	0		-	9.80	21.30	7	7	100.0	77	58	75.3	12.49	7.47	1.29	2.71	93.3
METALS																		
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	0.20	ONT-MOE	0.01	0.04	12	12	100.0	233	220	94.4	0.02	0.03	1.60	2.62	100.0
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	3750.00	ONT-MOE	170.00	600.00	14	14	100.0	267	267	100.0	200.00	340.90	1.39	2.14	100.0
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	30.00	ONT-MOE	40.00	160.00	14	14	100.0	267	262	98.1	70.00	53.30	1.55	2.48	100.0
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	75.00	ONT-MOE	70.00	5800.00	14	10	71.4	264	196	74.2	80.00	101.70	5.53	3.72	96.4
NIUT	NICKEL,UNFILT.TOTAL	ug/L	0	25.00	ONT-MOE	10.00	40.00	14	10	71.4	267	171	64.0	10.00	22.10	2.17	3.60	85.7
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	100.00	ONT-MOE	10.00	10.00	14	8	57.1	267	137	51.3	10.00	9.00	1.43	2.00	89.3
COUT	COBALT,UNFILT.TOTAL	ug/L	0	5.00	NYS-STD	10.00	20.00	14	7	50.0	266	65	24.4	10.00	6.40	1.68	1.54	82.1
CUUT	COPPER,UNFILT.TOTAL	ug/L	0	5.00	ONT-MOE	20.00	20.00	2	1	50.0	47	30	63.8	10.00	13.10	2.67	2.56	77.8
MOUT	MOLYBDENUM,UNFILT.TOTAL	ug/L	0		-	10.00	20.00	14	4	28.6	267	75	28.1	10.00	6.60	1.55	1.56	67.9
CCNPUR	CYANIDE-FREE,UNFILT.REAC.	ug/L	0	5.00	ONT-MOE	10.00	10.00	11	1	9.1	222	42	18.9	0.00	1.30	1.87	3.68	46.4
CDUT	CADMIUM,UNFILT.TOTAL	ug/L	0	0.20	ONT-MOE	0.00	0.00	14	1	7.1	267	65	24.3	0.00	2.10	1.31	2.07	71.4
PBUT	LEAD,UNFILT.TOTAL	ug/L	0	25.00	ONT-MOE	40.00	40.00	14	1	7.1	267	25	9.4	10.00	16.50	1.40	1.48	60.7
PESTICIDES,HERBICIDES,PCBS																		
P24D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	4.00	ONT-MOE	0.03	0.22	12	10	83.3	227	177	78.0	0.07	0.08	2.88	4.71	100.0
P1BHCG	GAMMA-BHC(HEXCHLORCYCLOHEXANE)	ug/L	2	0.06	ONT-MOE	0.02	0.16	12	3	25.0	227	157	69.2	0.01	0.02	3.02	2.48	98.4
P1DGDT	METHOXYCHLOR	ug/L	1	0.04	ONT-MOE	0.40	1.20	12	2	16.7	227	31	13.7	0.04	0.04	3.72	2.72	35.7
P1BHCA	ALPHA-BHC(HEXCHLORCYCLOHEXANE)	ug/L	1	0.00	NYS-GUL	0.02	0.02	12	1	8.3	227	5	2.2	0.01	0.01	1.49	1.24	14.3
P36ILV	SILVEX	ug/L	3		-	0.05	0.05	12	1	8.3	227	23	10.1	0.03	0.03	1.31	1.83	50.0
VOLATILES ORGANIC COMPOUNDS																		
X1111T	1,1,1-TRICHLOROETHANE	ug/L	1	50.00	NYS-GUL	4.30	27.00	12	7	58.3	224	18	8.0	5.07	1.18	4.54	1.86	28.6
X1CHLO	CHLOROFORM	ug/L	1	0.20	NYS-STD	2.60	2.90	12	2	16.7	224	37	16.5	1.18	1.37	1.48	2.18	64.3
X111CE	1,1-DICHLOROETHANE	ug/L	1	50.00	NYS-GUL	2.20	2.20	12	1	8.3	224	3	1.3	1.07	1.01	1.26	1.10	10.7
X1DCLE	1,1-DICHLOROETHENE	ug/L	1	0.07	NYS-GUL	2.30	2.30	12	1	8.3	224	1	0.5	1.07	1.01	1.26	1.18	3.6
X1TRIC	TRICHLOROETHYLENE	ug/L	1	3.00	NYS-GUL	2.00	2.00	12	1	8.3	224	17	7.6	1.06	1.12	1.22	1.55	21.4

PLANT NAME : Toronto (Highland) **SAMPLING TYPE : Raw Sludge**
PLANT TYPE : Secondary **SAMPLE FORM : Dry Weight**

CONTAMINANT	CONTAMINANT NAME	UNITS (DRY WEIGHT)	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
COD	CHEMICAL OXYGEN DEMAND	mg/kg	0	1366013.07	1401294.50	2	2	100.0	45	45	100.0	1383541.33	892221.45	1.02	3.19	100.0
NNHTPR	AMMONIUM,TOTAL FIL.T.REAC.	mg/kg	0	5784.31	14498.38	2	2	100.0	48	47	97.9	9157.68	5911.32	1.92	4.59	100.0
NNOTPR	NITRATES,TOTAL FIL.T.REAC.	mg/kg	0	31.05	50.16	2	2	100.0	48	43	89.6	39.46	25.44	1.40	2.21	93.9
NNTKUR	NITROGEN-TOT-KJEL.,UNF.TOT	mg/kg	0	58252.43	60457.52	2	2	100.0	51	51	100.0	59344.73	36897.85	1.03	2.98	100.0
PH	(-LOG(H+(CONCN))	mg/kg	0	6.07	6.59	2	2	100.0	49	49	100.0	6.32	6.03	1.06	1.10	100.0
PHENOL	PHENOLICS (4AAP)	mg/kg	0	84.97	207.12	2	2	100.0	50	41	82.0	132.66	82.34	1.88	3.54	85.3
PPUT	PHOSPHORUS,UNFIL.T.TOTAL.	mg/kg	0	26568.63	28317.15	2	2	100.0	42	42	100.0	27428.96	20347.70	1.05	4.43	100.0
RST	RESIDUE, TOTAL	mg/kg	0	30600.00	30900.00	2	2	100.0	51	51	100.0	30749.63	32783.51	1.01	1.81	100.0
RSTLOI	RESIDUE,TOT.LOSS ON IGNI.	mg/kg	0	20400.00	20600.00	2	2	100.0	51	51	100.0	20499.76	20803.05	1.01	1.77	100.0
METALS																
AGUT	SILVER,UNFIL.T.TOTAL.	mg/kg	0	55.56	62.78	2	2	100.0	45	40	88.9	59.06	30.17	1.09	2.61	84.4
ALUT	ALUMINUM,UNFIL.T.TOTAL.	mg/kg	0	5774.76	6209.15	2	2	100.0	51	51	100.0	5988.02	9835.74	1.05	2.51	100.0
ASUT	ARSENIC,UNFIL.T.TOTAL.	mg/kg	0	6.47	8.82	2	2	100.0	51	50	98.0	7.56	6.13	1.25	2.01	97.1
CDUT	CADMIUM,UNFIL.T.TOTAL.	mg/kg	0	23.86	32.04	2	2	100.0	43	40	93.0	27.65	9.74	1.23	4.35	90.0
COUT	COBALT,UNFIL.T.TOTAL.	mg/kg	0	13.40	17.48	2	2	100.0	41	30	73.2	15.30	9.29	1.21	4.69	73.3
CRUT	CHROMIUM,UNFIL.T.TOTAL.	mg/kg	0	366.34	457.52	2	2	100.0	51	50	98.0	409.40	301.43	1.17	3.68	97.1
CUUT	COPPER,UNFIL.T.TOTAL.	mg/kg	0	1274.51	1502.59	2	2	100.0	46	46	100.0	1383.86	606.31	1.12	1.72	100.0
HGUT	MERCURY,UNFIL.T.TOTAL.	mg/kg	0	1.94	2.29	2	2	100.0	50	50	100.0	2.11	2.23	1.12	1.67	100.0
MOUT	MOLYBDENUM,UNFIL.T.TOTAL.	mg/kg	0	9.48	9.48	1	1	100.0	37	23	62.2	9.48	5.80	0.00	2.88	64.3
NIUT	NICKEL,UNFIL.T.TOTAL.	mg/kg	0	37.86	39.22	2	2	100.0	46	44	95.7	38.53	59.17	1.03	2.90	93.3
PBUT	LEAD,UNFIL.T.TOTAL.	mg/kg	0	232.36	245.10	2	2	100.0	49	48	98.0	238.65	173.99	1.04	2.24	96.9
SEUT	SELENIUM,UNFIL.T.TOTAL.	mg/kg	0	2.91	4.58	2	2	100.0	50	48	96.0	3.65	3.04	1.38	1.93	93.9
SRUT	STRONTIUM,UNFIL.T.TOTAL.	mg/kg	0	130.10	130.72	2	2	100.0	51	51	100.0	130.41	231.70	1.00	1.97	100.0
ZNUT	ZINC,UNFIL.T.TOTAL.	mg/kg	0	1395.47	1470.59	2	2	100.0	51	51	100.0	1432.54	905.39	1.04	2.39	100.0
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PMMCRE	M-CRESOL	ug/kg	1	441176.50	491909.40	2	2	100.0	51	42	82.3	465852.80	116847.30	1.08	12.16	85.3
DIOXINS AND FURANS																
P98CDD	OCTACHLORODIBENZODIOXIN	ug/kg	1	29.70	110.00	2	2	100.0	50	25	50.0	57.20	8.50	2.52	3.60	58.8
PESTICIDES,HERBICIDES,PCBS																
P1PCBT	PCB, TOTAL	ug/kg	2	88.20	93.90	2	2	100.0	51	40	78.4	91.00	88.70	1.05	3.18	79.4
P324D	2,4-DICHLOROPHENOXYACETIC ACID	ug/kg	3	522.90	1294.50	2	2	100.0	51	38	74.5	822.70	93.20	1.90	6.50	82.3
P1BHCA	ALPHA-BHC(HEXACHLORCYCLHEXANE)	ug/kg	1	22.70	22.70	2	1	50.0	51	12	23.5	8.70	5.50	3.91	2.74	35.3
P1BHCD	DELTA-BHC(HEXACHLORCYCLHEXANE)	ug/kg	1	6.50	6.50	2	1	50.0	51	3	5.9	4.60	4.00	1.62	2.22	8.8
P1BHCG	GAMMA-BHC(HEXACHLORCYCLHEXANE)	ug/kg	2	22.70	22.70	2	1	50.0	51	28	54.9	8.70	8.90	3.91	2.69	67.7
P1DMDT	METHOXYCHLOR	ug/kg	1	388.30	388.30	2	1	50.0	51	19	37.3	79.60	45.80	9.41	5.15	44.1
P1END2	ENDOSULFAN II	ug/kg	3	35.60	35.60	2	1	50.0	51	6	11.8	10.80	4.20	5.38	2.38	17.7
P1END5	ENDOSULFAN SULPHATE	ug/kg	3	113.30	113.30	2	1	50.0	51	6	11.8	38.50	18.60	4.60	2.80	17.7
P245T	2,4,5-TRICHLOROPHENOXYACETIC ACID	ug/kg	3	239.50	239.50	2	1	50.0	51	21	41.2	62.50	48.90	6.69	3.49	47.1
P35HLV	SILVEX	ug/kg	3	58.30	58.30	2	1	50.0	51	23	45.1	30.80	47.30	2.46	3.40	55.9

PLANT NAME : Toronto (Highland)
PLANT TYPE : Secondary

SAMPLING TYPE : Raw Sludge
SAMPLE FORM : Dry Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS (DRY WEIGHT)	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
VOLATILE ORGANIC COMPOUNDS																
B2EBNZ	ETHYLBENZENE (C8H10)	ug/kg	1	3883.50	3883.50	2	1	50.0	51	10	19.6	1593.20	890.70	3.53	2.60	26.5
B2MPXY	M-, AND P-XYLENES	ug/kg	1	4207.10	4207.10	2	1	50.0	51	16	31.4	1658.20	1345.90	3.73	3.86	41.2

PLANT NAME : Toronto (Highland)
PLANT TYPE : Secondary

SAMPLING TYPE : TreatedSludge
SAMPLE FORM : Dry Weight

CONTAM-INANT	CONTAMINANT NAME	UNITSQA/QC (DRY WEIGHT)	CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
COD	CHEMICAL OXYGEN DEMAND	mg/kg	0	65250.00	65250.00	1	1	100.0	36	36	100.0	65250.00	508097.94	0.00	4.65	100.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/kg	0	18000.00	19100.00	2	2	100.0	49	49	100.0	18541.85	38494.12	1.04	1.77	100.0
PH	(-LOG(H+(CONCN))	mg/kg	0	7.00	7.10	2	2	100.0	47	47	100.0	7.05	7.17	1.01	1.08	100.0
PHENOL	PHENOLICS (4AAP)	mg/kg	0	21.78	45.00	2	2	100.0	49	41	83.7	31.30	43.05	1.67	3.14	87.9
PPUT	PHOSPHORUS,UNFIL.T.TOTAL	mg/kg	0	37500.02	11844160.00	2	2	100.0	43	43	100.0	666450.43	76638.67	58.53	6.91	100.0
RST	RESIDUE, TOTAL	mg/kg	0	349000.00	400000.00	2	2	100.0	50	50	100.0	373630.83	80434.06	1.10	3.23	100.0
RSTLOI	RESIDUE,TOT.LOSS ON IGNI.	mg/kg	0	219626.00	240560.00	2	2	100.0	50	50	100.0	229854.80	43379.33	1.07	3.19	100.0
METALS																
AGUT	SILVER,UNFIL.T.TOTAL	mg/kg	0	76.28	83.09	2	2	100.0	44	44	100.0	79.61	37.78	1.06	2.33	100.0
ALUT	ALUMINUM,UNFIL.T.TOTAL	mg/kg	0	7193.55	7449.86	2	2	100.0	50	50	100.0	7320.58	10715.94	1.05	2.82	100.0
ASUT	ARSENIC,UNFIL.T.TOTAL	mg/kg	0	2.38	4.50	2	2	100.0	50	49	98.0	3.27	5.40	1.57	2.06	97.1
CDUT	CADMIUM,UNFIL.T.TOTAL	mg/kg	0	28.65	37.78	2	2	100.0	45	41	91.1	32.90	10.47	1.22	3.98	90.3
COUT	COBALT,UNFIL.T.TOTAL	mg/kg	0	12.61	17.50	2	2	100.0	39	32	82.1	14.85	9.14	1.26	2.75	85.7
CRUT	CHROMIUM,UNFIL.T.TOTAL	mg/kg	0	402.20	544.41	2	2	100.0	50	50	100.0	467.93	333.06	1.24	3.59	100.0
CUUT	COPPER,UNFIL.T.TOTAL	mg/kg	0	1633.24	1968.45	2	2	100.0	45	45	100.0	1793.03	732.34	1.14	2.16	100.0
HGUT	MERCURY,UNFIL.T.TOTAL	mg/kg	0	2.30	2.78	2	2	100.0	50	49	98.0	2.53	3.24	1.14	2.04	97.1
MOUT	MOLYBDENUM,UNFIL.T.TOTAL	mg/kg	0	5.85	11.46	2	2	100.0	34	23	67.7	8.19	6.41	1.61	2.84	69.2
NIUT	NICKEL,UNFIL.T.TOTAL	mg/kg	0	42.43	45.85	2	2	100.0	45	42	93.3	44.10	72.95	1.06	2.95	90.0
PBUT	LEAD,UNFIL.T.TOTAL	mg/kg	0	270.00	315.19	2	2	100.0	50	49	98.0	291.72	196.62	1.12	2.46	97.1
SEUT	SELENIUM,UNFIL.T.TOTAL	mg/kg	0	1.38	2.50	2	2	100.0	50	48	96.0	1.85	2.67	1.53	2.98	97.1
SRUT	STRONTIUM,UNFIL.T.TOTAL	mg/kg	0	156.53	160.46	2	2	100.0	50	50	100.0	158.48	240.93	1.02	2.54	100.0
ZNUT	ZINC,UNFIL.T.TOTAL	mg/kg	0	1704.98	1747.85	2	2	100.0	50	50	100.0	1726.28	988.90	1.02	2.57	100.0
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PMOCRE	M-CRESOL	ug/kg	1	7750.00	58452.70	2	2	100.0	50	15	30.0	21284.00	5281.80	4.17	8.20	35.3
DIOXINS AND FURANS																
P87CDD	HEPTACHLORODIBENZODIOXIN	ug/kg	1	4.60	32.50	2	2	100.0	49	10	20.4	12.20	5.00	3.98	3.21	23.5
P8OCDD	OCTACHLORODIBENZODIOXIN	ug/kg	1	11.50	80.00	2	2	100.0	49	26	53.1	30.30	7.10	3.80	3.84	64.7
P86CDD	HEXACHLORODIBENZODIOXIN	ug/kg	2	1.10	1.10	2	1	50.0	49	2	4.1	0.90	2.40	1.38	3.52	5.9
PESTICIDES,HERBICIDES,PCBS																
P1PDE	PP-DDE	ug/kg	1	6.00	9.80	2	2	100.0	50	34	68.0	7.70	11.10	1.41	2.72	73.5
P0PCNB	PCNB	ug/kg	2	62.70	62.70	2	1	50.0	22	2	9.1	29.90	22.60	2.84	1.51	14.3
P1BHCA	ALPHA-BHC(HEXACHLORCYCLOHEXANE)	ug/kg	1	77.80	77.80	2	1	50.0	50	11	22.0	15.00	5.60	10.36	3.00	32.4
P1BHCB	BETA-BHC (HEXACHLORCYCLOHEXANE)	ug/kg	1	44.90	44.90	2	1	50.0	50	19	38.0	11.40	8.80	6.94	4.39	47.1
P1PCBT	PCB, TOTAL	ug/kg	2	142.00	142.00	2	1	50.0	50	32	64.0	59.60	114.10	3.42	4.58	67.7
P1PPDT	PP-DDT	ug/kg	3	46.20	46.20	2	1	50.0	50	5	10.0	23.00	16.70	2.67	2.14	14.7
P24D	2,4-DICHLOROPHENOXYACETIC ACID	ug/kg	3	129.20	129.20	2	1	50.0	50	25	50.0	43.00	75.00	4.74	5.81	64.7
X28CB	HEXACHLOROBENZENE	ug/kg	2	7.40	7.40	2	1	50.0	50	21	42.0	4.30	7.00	2.15	2.96	55.9

PLANT NAME : Toronto (Highland)
PLANT TYPE : Secondary

SAMPLING TYPE : TreatedSludge
SAMPLE FORM : Dry Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS (DRY WEIGHT)	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
VOLATILE ORGANIC COMPOUNDS																
B2MPXY	M-, AND P-XYLENES	ug/kg	1	925.00	1432.70	2	2	100.0	50	15	30.0	1151.20	816.00	1.36	7.11	32.4
B2EBNZ	ETHYLBENZENE (C8H10)	ug/kg	1	475.00	475.00	2	1	50.0	50	14	28.0	165.00	608.50	4.46	5.59	32.4
B2OXYL	O-XYLENE (C8H10)	ug/kg	1	325.00	325.00	2	1	50.0	50	14	28.0	136.50	523.50	3.41	4.05	32.4
X1CHLO	CHLOROFORM (CHCL3)	ug/kg	1	825.00	825.00	2	1	50.0	50	12	24.0	217.40	441.70	6.59	4.33	35.3
X214CB	1,4-DICHLOROBENZENE	ug/kg	1	220.00	220.00	2	1	50.0	50	2	4.0	112.30	272.70	2.59	3.28	5.9

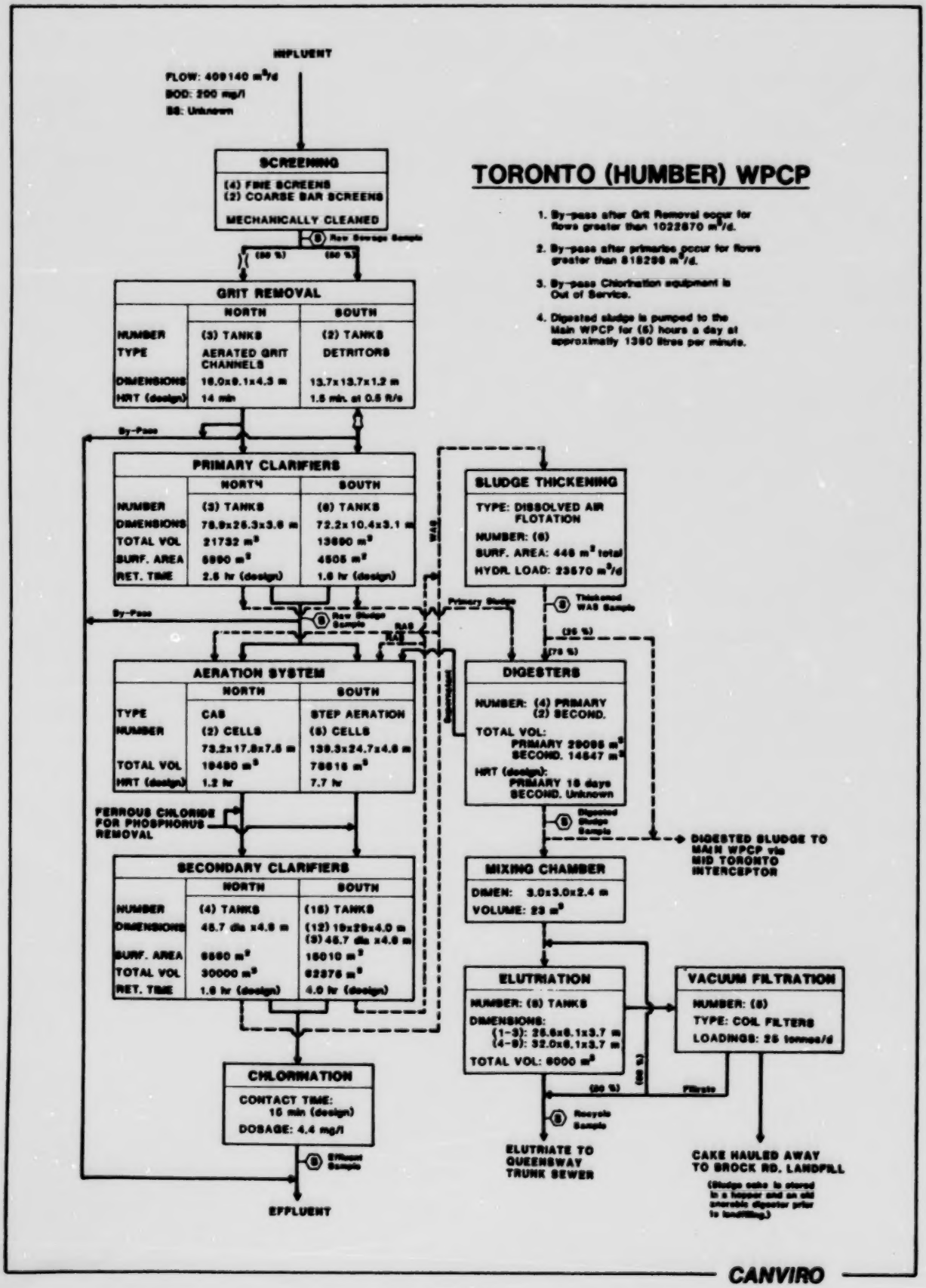
Sub-Appendix A-30

Toronto (Humber) WPCP

Contents:

- Plant Schematic with Design Characteristics
- Annual Data Review (1981 - 1986 Plant Performance)
- Sources of Municipal Water Pollution Control Plant Raw Sewage
- Operational Evaluation for Toronto (Humber) WPCP
- Analytical Data

(KIR18/28A)



TORONTO (HUMBER) WPCP

1. By-pass after Grit Removal occur for flows greater than 1022670 m³/d.
2. By-pass after primaries occur for flows greater than 818298 m³/d.
3. By-pass Chlorination equipment is Out of Service.
4. Digested sludge is pumped to the Main WPCP for (6) hours a day at approximately 1380 litres per minute.

CANVIRO

HUMBER WPCP (ETOBICOKE)
Conventional Activated Sludge
Phosphorus Removal - Continuous
Capacity - 409.140 10(3)m3/day

PARAMETER	1981	1982	1983	1984	1985	5 YEAR AVERAGE 81-85
Avg. Daily Flow (1000 m3/day)	405.96	368.68	365.50	339.55	378.11	371.56
BOD5 - Influent (mg/L)	255.30	259.00	287.00	266.42	264.00	266.34
BOD5 - Effluent (mg/L)	16.40	14.00	14.10	12.67	11.50	13.09
Annual BOD5 Significantly Different from Mean Annual Average BOD5?	I.D.	I.D.	I.D.	I.D.	I.D.	
TSS - Influent (mg/L)	348.40	385.00	363.00	385.50	325.50	361.50
TSS - Effluent (mg/L)	24.20	18.70	22.50	26.25	18.17	21.96
Annual TSS Significantly Different from Mean Annual Average TSS?	I.D.	I.D.	I.D.	I.D.	I.D.	
Total P - Influent (mg/L)	9.60	10.40	9.04	10.00	8.86	9.58
Total P - Effluent (mg/L)	1.50	1.24	1.04	1.43	1.00	1.26
Annual TP Significantly Different from Mean						
Annual Average TP?	I.D.	I.D.	I.D.	I.D.	I.D.	
TP in Compliance?	N	N	N	N	N	N

I.D. - Insufficient Data

R

SOURCES OF MUNICIPAL WATER POLLUTION CONTROL PLANT RAW SEWAGE

GENERAL DESCRIPTION OF WATER POLLUTION CONTROL PLANT (WPCP)

NAME OF WPCP	HUMBER WPCP
WORKS NUMBER	120000382
TREATMENT TYPE	CONVENTIONAL ACTIVATED SLUDGE PHOSPHORUS REMOVAL CONTINUOUS
DESIGN CAPACITY (1000 m3/d)	409.140
1986 AVERAGE DAY FLOW (1000 m3/d)	393.599
POPULATION SERVED	600000

% OF TOTAL FLOW ATTRIBUTED TO:

INDUSTRIAL SOURCES (%)	19
COMMERCIAL SOURCES (%) (Population x 0.0757)	12
RESIDENTIAL SOURCES (%) (Population x 0.175)	27
UNACCOUNTED FOR, INCL. INFILTRATION (100-% Contributed from industrial, commercial and residential sources)	43

PROFILE OF INDUSTRIES IN CATCHMENT

TOTAL NO OF INDUSTRIES	1777
INDUSTRIES WITH WATER	1628
NO OF SIC CATEGORIES	60

DESCRIPTION OF THE TOP 5 INDUSTRIES DISCHARGED TO THE WPCP (BASED ON WATER USE DATA)

DESCRIPTION	SIC	# OF COMPANIES
BEVERAGES	2082-2087	18
PRINTING AND PUBLISHING	2700-2799	162
METAL FINISHING	3411-3469	218
MACHINERY MFG	3500-3599	246
PLASTICS MOLDING	3070-3079	91

OPERATIONAL EVALUATION FOR: TORONTO HUMBER WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: July 26,1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 409,140 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
RAW SEWAGE FLOW	427.400	447.500	439.600	484.000			
% of Design Flow	104.46%	109.38%	107.44%	118.30%			
Influent BOD (mg/L)	250	290	310	250			150
Primary BOD (mg/L)	150	195	145	215			120
Secondary BOD (mg/L)	3	14	7	9			8
% PRIMARY REMOVAL	40.0	32.8	53.2	14.0			20.0
% SECONDARY REMOVAL	98.8	95.2	97.7	96.4			94.7
Influent SS (mg/L)	460	445	575	370	320	190	315
Primary SS (mg/L)	190	150	95	185	150	160	145
Secondary SS (mg/L)	7	54	38	22	64	23	29
% PRIMARY REMOVAL	58.7	66.3	83.5	50.0	53.1	15.8	54.0
% SECONDARY REMOVAL	98.5	87.9	93.4	94.1	80.0	87.9	90.8
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)	10.9	9.6	13.2	7.7	7.3	7.8	7.4
Primary Total P (mg/L)							
Secondary Total P (mg/L)	0.32	1.52	0.68	0.76	2.10	1.00	0.52
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	97.1	84.2	94.8	90.1	71.2	87.2	93.0

OPERATIONAL EVALUATION FOR: T O R O N T O H U M B E R W P C P

TREATMENT FACILITY: Secondary
PERIOD ENDING: July 26,1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 409,140 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 8	DAY 9	DAY 10	DAY 11	DAY 12	DAY 13	DAY 14
RAW SEWAGE FLOW		521,100	408,600	398,200	400,700	365,400	362,400
% of Design Flow		127.36%	99.87%	97.33%	97.94%	89.31%	88.58%
Influent BOD (mg/L)	195	195	250	215			70
Primary BOD (mg/L)	150	140	205	160			70
Secondary BOD (mg/L)	6	5	13	9			9
% PRIMARY REMOVAL	23.1	28.2	18.0	25.6			0.0
% SECONDARY REMOVAL	96.9	97.4	94.8	95.8			87.1
Influent SS (mg/L)	390	300	410	485	230	220	210
Primary SS (mg/L)	120	140	185	170	140	150	100
Secondary SS (mg/L)	17	20	33	23	29	56	32
% PRIMARY REMOVAL	69.2	53.3	54.9	64.9	39.1	31.8	52.4
% SECONDARY REMOVAL	95.6	93.3	92.0	95.3	87.4	74.5	84.8
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)	9.3	7.4	10.6	9.1	7.4	6.9	5.9
Primary Total P (mg/L)							
Secondary Total P (mg/L)	0.48	0.92	1.04	0.92	0.92	1.64	0.86
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	94.8	87.6	90.2	89.9	87.6	76.2	85.4

OPERATIONAL EVALUATION FOR: TORONTO HUMBER WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: July 26,1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 409,140 m3/d

PARAMETER	SAMPLING PERIOD						
	DAY 15	DAY 16	DAY 17	DAY 18	DAY 19	DAY 20	DAY 21
RAW SEWAGE FLOW	567,900	435,900	427,400	436,600	473,300	403,700	358,100
% of Design Flow	138.80%	106.54%	104.46%	106.71%	115.68%	98.67%	87.53%
Influent BOD (mg/L)	185	125	210	395			115
Primary BOD (mg/L)	150	140	125	200			80
Secondary BOD (mg/L)	5	18	5	4			2
% PRIMARY REMOVAL	18.9	-12.0	40.5	49.4			30.4
% SECONDARY REMOVAL	97.3	85.6	97.6	99.0			98.3
Influent SS (mg/L)	305	265	310	855	260	185	280
Primary SS (mg/L)	115	115	115	125	115	130	150
Secondary SS (mg/L)	4	7	20	6	12	10	9
% PRIMARY REMOVAL	62.3	56.6	82.9	99.3	95.4	94.6	96.8
% SECONDARY REMOVAL	98.7	97.4	93.5				
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)	5.4	6.8	7.2	15.6	5.5	5.5	7.2
Primary Total P (mg/L)							
Secondary Total P (mg/L)	0.34	2.30	0.42	0.28	0.28	0.24	0.24
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	93.7	66.2	94.2	98.2	94.9	95.6	96.7

OPERATIONAL EVALUATION FOR: TORONTO HUMBER WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: February 13, 1987
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: 409,140 m3/d

PARAMETER	PRE-SAMPLING PERIOD						
	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
RAW SEWAGE FLOW	372,100	380,210	372,920	381,630	410,000	363,390	372,920
% of Design Flow	90.95%	92.93%	91.15%	93.28%	100.21%	88.82%	91.15%
Influent BOD (mg/L)	275.0	185.0	215.0	290.0			270.0
Primary BOD (mg/L)	180.0	170.0	180.0	240.0			190.0
Secondary BOD (mg/L)	4.0	6.0	13.0	19.0			9.0
% PRIMARY REMOVAL	34.5%	8.1%	16.3%	17.2%			29.6%
% SECONDARY REMOVAL	98.5%	96.8%	94.0%	93.4%			96.7%
Influent SS (mg/L)	376.0	332.0	348.0	240.0	336.0	388.0	568.0
Primary SS (mg/L)	152.0	100.0	220.0	182.0	152.0	168.0	192.0
Secondary SS (mg/L)	14.0	11.0	42.0	38.0	28.0	46.0	30.0
% PRIMARY REMOVAL	59.6%	69.9%	36.8%	24.2%	54.8%	56.7%	66.2%
% SECONDARY REMOVAL	96.3%	96.7%	87.9%	84.2%	91.7%	88.1%	94.7%
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)	10.00	9.80	9.00	7.40	10.00	8.60	8.20
Primary Total P (mg/L)							
Secondary Total P (mg/L)	0.30	0.50	2.20	2.70	0.80	0.90	0.40
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	97.0%	94.9%	75.6%	63.5%	92.0%	89.5%	95.1%

OPERATIONAL EVALUATION FOR: T O R O N T O H U M B E R W P C P

TREATMENT FACILITY: Secondary
PERIOD ENDING: February 13, 1987
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: 409,140 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 8	DAY 9	DAY 10	DAY 11	DAY 12	DAY 13	DAY 14
RAW SEWAGE FLOW	444,260	502,220	523,700	408,380	337,250	341,910	334,610
% of Design Flow	108.58%	122.75%	128.00%	99.81%	82.43%	83.57%	81.78%
Influent BOD (mg/L)	290.0	225.0	315.0	265.0			300.0
Primary BOD (mg/L)	265.0	195.0	265.0	210.0			240.0
Secondary BOD (mg/L)	12.0	19.0	18.0	18.0			10.0
% PRIMARY REMOVAL	8.6%	13.3%	15.9%	20.8%			20.0%
% SECONDARY REMOVAL	95.9%	91.6%	94.3%	93.2%			96.7%
Influent SS (mg/L)	320.0	372.0	592.0	264.0	268.0	272.0	524.0
Primary SS (mg/L)	184.0	144.0	208.0	196.0	196.0	112.0	136.0
Secondary SS (mg/L)	24.0	56.0	48.0	36.0	36.0	14.0	16.0
% PRIMARY REMOVAL	42.5%	61.3%	64.9%	25.8%	26.9%	58.8%	74.0%
% SECONDARY REMOVAL	92.5%	84.9%	91.9%	86.4%	86.6%	94.9%	96.9%
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)	11.00	8.80	9.20	8.10	7.90	9.00	15.00
Primary Total P (mg/L)							
Secondary Total P (mg/L)	0.60	2.90	2.70	2.70	0.90	1.40	0.60
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	94.5%	67.0%	70.7%	66.7%	88.6%	84.4%	96.0%

OPERATIONAL EVALUATION FOR: TORONTO HUMBER WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: February 13, 1987
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: 409,140 m3/d

PARAMETER	SAMPLING PERIOD DAY 15	DAY 16	DAY 17	DAY 18	DAY 19	DAY 20	DAY 21
RAW SEWAGE FLOW	344,140	363,800	389,270	370,080	363,190		
% of Design Flow	84.11%	88.92%	90.26%	90.45%	88.77%		
Influent BOD (mg/L)	220.0	290.0	310.0				
Primary BOD (mg/L)	180.0	250.0	245.0				
Secondary BOD (mg/L)	10.0	19.0	8.0				
% PRIMARY REMOVAL	18.2%	13.8%	21.0%				
% SECONDARY REMOVAL	95.5%	93.4%	97.4%				
Influent SS (mg/L)	412.0	324.0	210.0	310.0	235.0		
Primary SS (mg/L)	188.0	152.0	130.0	150.0	120.0		
Secondary SS (mg/L)	36.0	62.0	7.0	13.0	25.0		
% PRIMARY REMOVAL	54.4%	53.1%	38.1%	51.6%	48.9%		
% SECONDARY REMOVAL	91.3%	80.9%	96.7%	95.8%	89.4%		
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)	9.40	9.00	8.70	7.50	8.00		
Primary Total P (mg/L)							
Secondary Total P (mg/L)	0.50	0.50	2.70	1.00	1.30		
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	94.7%	94.4%	69.0%	86.7%	83.7%		

PLANT NAME : Toronto (Humber)
PLANT TYPE : Secondary

SAMPLING TYPE : Raw Sewage
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	PLANT MIN. CONC. > \ DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0	239.00	549.00	8	8	100.0	267	266	99.6	328.36	140.23	1.37	1.93	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0	392.00	1120.00	9	9	100.0	260	258	99.2	634.23	287.75	1.39	1.82	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0	21.00	49.50	8	8	100.0	271	271	100.0	26.73	22.39	1.34	1.81	100.0
NNHTFR	AMMONIUM,TOTAL FILT.REAC.	mg/L	0	15.60	29.20	10	10	100.0	275	274	99.6	19.62	15.37	1.26	1.69	100.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0	30.00	49.30	10	10	100.0	273	273	100.0	36.86	25.44	1.17	1.47	100.0
PH	(-LOG(H+(CONCN))		0	6.26	6.80	10	10	100.0	275	275	100.0	6.60	6.90	1.02	1.05	100.0
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/L	0	7.05	12.70	11	11	100.0	248	248	100.0	9.26	5.18	1.20	1.51	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0	22.10	366.00	8	8	100.0	267	266	99.6	206.79	126.88	2.51	1.93	100.0
RSPLOI	RESIDUE,PAR.LOSS ON IGNI.	mg/L	0	17.50	215.00	5	5	100.0	90	89	98.9	120.31	100.84	2.96	1.78	100.0
PHNOL	PHENOLICS (4AAP)	mg/L	0	0.60	3.40	10	3	30.0	275	37	13.5	0.42	0.31	2.57	2.05	37.8
METALS																
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	800.00	3100.00	11	11	100.0	322	306	95.0	1620.00	1000.10	1.59	2.65	97.3
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	170.00	400.00	11	11	100.0	322	237	73.6	260.00	51.10	1.29	3.44	89.2
CUUT	COPPER,UNFILT.TOTAL	ug/L	0	200.00	360.00	2	2	100.0	49	48	98.0	270.00	110.60	1.52	2.28	97.1
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	210.00	340.00	11	11	100.0	319	318	99.7	230.00	370.70	1.17	2.14	100.0
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	540.00	2300.00	11	11	100.0	322	315	97.8	990.00	211.00	1.68	2.94	100.0
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	0.14	1.30	11	10	90.9	283	274	96.8	0.45	0.23	1.98	2.11	100.0
CDUT	CADMIUM,UNFILT.TOTAL	ug/L	0	10.00	260.00	11	9	81.8	322	76	23.6	20.00	6.50	2.81	2.09	70.3
NIUT	NICKEL,UNFILT.TOTAL	ug/L	0	90.00	310.00	11	9	81.8	322	103	32.0	140.00	38.80	1.99	2.70	54.1
CCNFUR	CYANIDE-FREE,UNFILT.REAC.	ug/L	0	10.00	60.00	10	8	80.0	271	82	30.3	10.00	1.90	4.36	6.88	32.6
AGUT	SILVER,UNFILT.TOTAL	ug/L	0	10.00	40.00	11	8	72.7	321	82	25.6	20.00	10.40	2.11	2.55	75.7
COUT	COBALT,UNFILT.TOTAL	ug/L	0	50.00	60.00	11	5	45.5	322	82	25.5	20.00	9.30	3.50	2.31	83.8
PBUT	LEAD,UNFILT.TOTAL	ug/L	0	160.00	160.00	11	2	18.2	322	57	17.7	70.00	59.50	1.55	1.86	51.4
MOUT	MOLYBDENUM,UNFILT.TOTAL	ug/L	0	60.00	60.00	11	1	9.1	321	41	12.8	20.00	12.40	1.86	1.72	56.8
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PM04CRE	M-CRESOL	ug/L	1	30.00	456.80	10	10	100.0	275	167	60.7	77.67	25.59	2.49	3.45	86.5
PMPHEN	PHENOL	ug/L	2	15.80	58.70	10	7	70.0	275	118	42.9	19.22	14.52	2.11	2.46	78.4
PM88P	BUTYLBENZYLPHTHALATE	ug/L	1	27.70	57.80	10	2	20.0	275	34	12.4	7.58	5.85	2.44	1.66	37.8
PNNAPH	NAPHTHALENE	ug/L	1	17.30	17.30	10	1	10.0	275	16	5.8	5.66	5.37	1.48	1.47	21.6
PESTICIDES,HERBICIDES,PCBS																
P324D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	0.09	0.53	10	6	60.0	276	214	77.5	0.09	0.13	4.00	3.72	100.0
P1BHC0	GAMMA-BHC(HEXCHLORCYCLHEXANE)	ug/L	2	0.02	0.06	10	5	50.0	276	143	51.8	0.02	0.02	2.06	2.29	94.6
P1PCBT	PCB, TOTAL	ug/L	2	0.22	0.53	10	3	30.0	276	42	15.2	0.07	0.06	2.81	2.31	46.0
P1PPDE	PP-DDE	ug/L	1	0.02	0.05	10	2	20.0	276	15	5.4	0.01	0.01	1.48	1.74	24.3
P1PPDT	PP-DDT	ug/L	3	0.13	0.18	10	2	20.0	276	9	3.3	0.05	0.04	1.77	1.35	18.9
P245T	2,4,5-TRICLORPHENOXYACETIC ACID	ug/L	3	0.17	0.20	10	2	20.0	276	22	8.0	0.06	0.06	1.74	1.60	37.8
P1END2	ENDOSULFAN II	ug/L	3	0.05	0.05	10	1	10.0	276	10	3.6	0.01	0.01	1.42	1.42	21.6
P1HEPT	HEPTACHLOR	ug/L	3	0.04	0.04	10	1	10.0	276	10	3.6	0.01	0.01	1.55	1.48	18.9
P1PPDD	PP-DDD	ug/L	1	0.09	0.09	10	1	10.0	276	6	2.2	0.01	0.01	2.00	1.38	13.5
X1HCCP	HEXACHLOROCYCLOPENTADIENE	ug/L	3	0.40	0.40	10	1	10.0	276	5	1.8	0.11	0.10	1.55	1.30	13.5
X2124	1,2,4-TRICHLOROBENZENE	ug/L	3	0.09	0.09	10	1	10.0	276	35	12.7	0.01	0.01	2.00	2.48	40.5
X2HCB	HEXACHLOROBENZENE	ug/L	2	0.02	0.02	10	1	10.0	276	11	4.0	0.01	0.01	1.25	1.39	18.9

PLANT NAME : Toronto (Humber)
PLANT TYPE : Secondary

SAMPLING TYPE : Raw Sewage
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	PLANT MIN. CONC. > MDL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
VOLATILES ORGANIC COMPOUNDS																
B2STYR	STYRENE	ug/L	1	43.00	1200.00	10	6	60.0	274	9	3.3	53.32	21.40	3.53	1.39	10.8
B2MPXY	M-, AND P-XYLENES	ug/L	1	57.00	200.00	10	3	30.0	274	43	15.7	32.77	26.00	2.34	2.02	37.8
B2OXYL	O-XYLENE	ug/L	1	49.00	200.00	10	3	30.0	274	25	9.1	30.41	22.47	2.16	1.56	24.3
B2EBNZ	ETHYLBENZENE	ug/L	1	54.00	120.00	10	2	20.0	274	30	11.0	26.42	23.50	1.85	1.75	29.7
X1111T	1,1,1-TRICHLOROETHANE	ug/L	1	43.00	43.00	10	1	10.0	274	21	7.7	23.59	23.18	1.27	1.74	18.9
X1TETR	TETRACHLOROETHYLENE	ug/L	1	90.00	90.00	10	1	10.0	274	12	4.4	23.25	23.51	1.61	1.53	18.9

PLANT NAME : Toronto (Humber) — **SAMPLING TYPE : Final Effluent**
PLANT TYPE : Secondary — **SAMPLE FORM : Wet Weight**

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	STD. FOR SURFACE WATER	STD. REF.	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET.	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																		
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0		-	11.80	43.30	8	8	100.0	213	211	99.1	25.76	21.22	1.53	2.07	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0		-	28.00	106.00	10	10	100.0	213	211	99.1	68.18	52.80	1.49	1.83	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0		-	6.40	10.20	8	8	100.0	220	220	100.0	8.14	8.09	1.20	1.60	100.0
NH4TPR	AMMONIUM,TOTAL FILT.REAC.	mg/L	0		-	9.20	14.20	10	10	100.0	223	204	91.5	11.75	3.90	1.18	6.98	100.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0		-	10.40	16.10	10	10	100.0	222	222	100.0	13.65	7.97	1.17	2.71	100.0
PH	(-LOG(H+(CONC#))		0		-	6.61	7.67	10	10	100.0	224	224	100.0	6.94	7.10	1.07	1.05	100.0
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/L	0		-	0.33	1.75	11	11	100.0	211	206	97.6	0.86	0.68	1.83	1.97	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0		-	8.50	96.00	8	8	100.0	220	219	99.6	20.29	10.12	2.18	2.00	100.0
RSPLOI	RESIDUE,PART.LOSS ON IGNI.	mg/L	0		-	5.30	101.00	5	5	100.0	77	58	75.3	13.80	7.47	3.51	2.71	95.3
PHNOL	PHENOLICS (4AAP)	mg/L	0	0.00	ONT-MOE	0.13	0.43	10	4	40.0	225	33	14.7	0.10	0.07	2.26	1.86	53.6
METALS																		
CUUT	COPPER,UNFILT.TOTAL	ug/L	0	5.00	ONT-MOE	10.00	10.00	2	2	100.0	47	30	63.8	10.00	13.10	1.00	2.56	77.8
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	3750.00	ONT-MOE	160.00	290.00	11	11	100.0	267	267	100.0	180.00	340.90	1.18	2.14	100.0
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	30.00	ONT-MOE	30.00	170.00	11	11	100.0	267	262	98.1	70.00	53.30	2.07	2.48	100.0
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	0.20	ONT-MOE	0.01	0.03	11	10	90.9	233	220	94.4	0.02	0.03	2.96	2.62	100.0
NIUT	NICKEL,UNFILT.TOTAL	ug/L	0	25.00	ONT-MOE	50.00	170.00	11	10	90.9	267	171	64.0	90.00	32.10	1.45	3.60	85.7
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	75.00	ONT-MOE	70.00	420.00	11	8	72.7	264	196	74.2	80.00	101.70	2.49	3.72	96.4
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	100.00	ONT-MOE	10.00	10.00	11	8	72.7	267	137	51.3	10.00	9.00	1.52	2.00	89.3
CCNFUR	CYANIDE-FREE,UNFILT.REAC.	ug/L	0	5.00	ONT-MOE	10.00	20.00	10	5	50.0	222	42	18.9	0.00	1.30	3.04	3.68	46.4
CDUT	CADMIUM,UNFILT.TOTAL	ug/L	0	0.20	ONT-MOE	0.00	10.00	11	3	27.3	267	65	24.3	0.00	2.10	2.46	2.07	71.4
MOUT	MOLYBDENUM,UNFILT.TOTAL	ug/L	0		-	10.00	10.00	11	3	27.3	267	75	28.1	10.00	6.60	1.38	1.56	67.9
PBUT	LEAD,UNFILT.TOTAL	ug/L	0	25.00	ONT-MOE	30.00	30.00	11	1	9.1	267	25	9.4	20.00	16.50	1.28	1.48	60.7
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																		
PM04CRS	M-CRESOL	ug/L	1		-	4.30	5.40	10	2	20.0	227	7	3.1	2.23	1.70	1.91	1.70	14.3
PNONTB	NITROBENZENE	ug/L	1	10.00	ONT-MOE	4.50	4.50	10	1	10.0	228	4	1.8	1.37	1.09	1.93	1.54	14.3
PESTICIDES,HERBICIDES,PCBS																		
P24D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	4.00	ONT-MOE	0.04	1.20	10	6	60.0	227	177	78.0	0.05	0.08	5.96	4.71	100.0
P1BHCG	GAMMA-BHC(HEXACHLORCYCLOHEXANE)	ug/L	2	0.06	ONT-MOE	0.01	0.03	10	5	50.0	227	157	69.2	0.01	0.02	2.15	2.48	96.4
P1PPDE	PP-DDE	ug/L	1	0.00	ONT-MOE	0.01	0.01	10	1	10.0	227	7	3.1	0.01	0.01	1.25	1.28	17.9
P36IL.V	3E.VEX	ug/L	3		-	0.08	0.08	10	1	10.0	227	23	10.1	0.03	0.03	1.44	1.83	50.0
X2124	1,2,4-TRICHLOROBENZENE	ug/L	3	0.50	ONT-MOE	0.03	0.03	10	1	10.0	227	36	15.9	0.01	0.01	1.76	2.44	32.1
VOLATILES ORGANIC COMPOUNDS																		
B2EBNZ	ETHYLBENZENE	ug/L	1	70.00	ONT-MOE	2.70	2.80	10	2	20.0	234	3	1.3	1.22	1.02	1.53	1.21	7.1
B2OXYL	O-XYLENE	ug/L	1	100.00	ONT-MOE	5.90	10.00	10	2	20.0	234	5	2.2	1.50	1.05	2.38	1.38	14.3
X1TETR	TETRACHLOROETHYLENE	ug/L	1	0.70	NYS-GUL	2.40	3.00	10	2	20.0	234	18	8.0	1.22	1.18	1.52	1.93	33.1
B2STYR	STYRENE	ug/L	1	15.00	ONT-MOE	13.00	13.00	10	1	10.0	234	1	0.5	1.86	1.51	1.98	1.16	3.0
X1111T	1,1,1-TRICHLOROETHANE	ug/L	1	50.00	NYS-GUL	2.30	2.30	10	1	10.0	234	18	8.0	1.09	1.18	1.30	1.84	28.6
X1DCFM	DICHLORODIFLUOROMETHANE	ug/L	2		-	53.00	53.00	10	1	10.0	234	1	0.5	11.81	10.07	1.69	1.12	3.6

PLANT NAME : Toronto (Humber) **SAMPLING TYPE : Recycle**
PLANT TYPE : Secondary **SAMPLE FORM : Wet Weight**

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	PLANT MIN. CONC. > MDL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0	625.00	625.00	1	1	100.0	20	20	100.0	625.00	905.21	0.00	2.32	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0	120.00	11580.00	10	10	100.0	39	39	100.0	2242.48	3439.26	4.34	4.55	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0	27.50	98.70	8	8	100.0	42	42	100.0	53.08	77.62	1.54	3.54	100.0
NNHTPR	AMMONIUM,TOTAL FILT.REAC.	mg/L	0	90.00	223.00	10	10	100.0	44	44	100.0	143.90	146.20	1.40	2.07	100.0
NNOTPR	NITRATES,TOTAL FILT.REAC.	mg/L	0	0.30	0.60	10	10	100.0	44	39	88.6	0.42	0.41	1.34	2.66	100.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0	160.00	80[illegible]0	9	9	100.0	42	42	100.0	377.47	324.28	1.75	1.95	100.0
PH	(-LOG(H+(CONCN))		0	6.57	[illegible].26	10	10	100.0	44	44	100.0	6.91	6.94	1.03	1.05	100.0
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/L	0	16.00	311.00	11	11	100.0	43	43	100.0	102.02	53.83	2.70	4.47	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0	1440.00	7840.00	8	8	100.0	42	42	100.0	4153.32	2242.77	1.82	3.60	100.0
RSPLOI	RESIDUE,PAR.LOSS ON IGNI.	mg/L	0	1530.00	4700.00	5	5	100.0	13	13	100.0	2920.90	1312.86	1.57	2.47	100.0
RST	RESIDUE, TOTAL	mg/L	0	3240.00	6460.00	3	3	100.0	3	3	100.0	4522.72	4522.72	1.41	1.41	100.0
RSTLOI	RESIDUE,TOT.LOSS ON IGNI.	mg/L	0	2330.00	4670.00	3	3	100.0	3	3	100.0	3268.83	3268.83	1.42	1.42	100.0
NNO2PR	NITRITE,FILT. REACT.	mg/L	0	0.03	0.14	8	6	75.0	42	36	85.7	0.04	0.05	2.76	3.13	100.0
PHNOL	PHENOLICS (4AAP)	mg/L	0	0.70	2.30	10	4	40.0	44	11	25.0	0.60	0.41	2.75	3.16	55.6
METALS																
AGUT	SILVER,UNFILT.TOTAL	ug/L	0	110.00	460.00	11	11	100.0	53	42	79.3	190.00	72.30	1.62	4.09	100.0
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	9800.00	60000.00	11	11	100.0	53	53	100.0	21820.00	28798.20	1.68	4.42	100.0
CAUT	CALCIUM,UNFILT.TOTAL	ug/L	0	92000.00	240000.00	11	11	100.0	54	54	100.0	143360.00	208447.60	1.38	1.87	100.0
CDUT	CADMIUM,UNFILT.TOTAL	ug/L	0	100.00	700.00	11	11	100.0	53	37	69.8	230.00	58.40	1.72	6.63	77.8
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	1400.00	7800.00	11	11	100.0	53	51	96.2	3220.00	874.70	1.64	6.11	100.0
CUUT	COPPER,UNFILT.TOTAL	ug/L	0	2900.00	2940.00	2	2	100.0	12	12	100.0	2920.00	1814.00	1.01	5.64	100.0
FEUT	IRON,UNFILT.TOTAL	ug/L	0	42000.00	400000.00	11	11	100.0	53	53	100.0	172840.00	109943.30	2.09	4.19	100.0
MGUT	MAGNESIUM,UNFILT.TOTAL	ug/L	0	19630.00	52000.00	11	11	100.0	54	54	100.0	30440.00	41620.20	1.35	1.78	100.0
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	370.00	1180.00	11	11	100.0	53	53	100.0	680.00	1347.00	1.41	2.13	100.0
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	5400.00	36000.00	11	11	100.0	53	53	100.0	12170.00	3112.40	1.69	7.41	100.0
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	0.25	12.00	11	10	90.9	47	44	93.6	2.11	1.68	3.26	4.49	100.0
NIUT	NICKEL,UNFILT.TOTAL	ug/L	0	200.00	700.00	11	10	90.9	53	41	77.4	370.00	308.60	1.56	3.08	88.9
PBUT	LEAD,UNFILT.TOTAL	ug/L	0	320.00	1400.00	11	10	90.9	53	36	67.9	560.00	429.50	2.23	6.62	100.0
ASUT	ARSENIC,UNFILT.TOTAL	ug/L	0	30.00	40.00	11	4	36.4	51	27	52.9	30.00	37.50	2.84	2.92	66.7
COUT	COBALT,UNFILT.TOTAL	ug/L	0	20.00	60.00	11	4	36.4	53	21	39.6	20.00	23.60	3.09	4.63	88.9
MOUT	MOLYBDENUM,UNFILT.TOTAL	ug/L	0	30.00	270.00	11	4	36.4	54	18	33.3	30.00	35.60	3.27	4.15	77.8
CCNFUR	CYANIDE-FREE,UNFILT.REAC.	ug/L	0	10.00	10.00	10	2	20.0	43	17	39.5	0.00	4.00	2.64	5.19	66.7
SEUT	SELENIUM,UNFILT.TOTAL	ug/L	0	30.00	40.00	11	2	18.2	51	25	49.0	30.00	44.20	3.53	3.52	55.6
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PM04CRE	M-CRESOL	ug/L	1	213.50	1400.00	10	9	90.0	43	27	62.8	606.22	562.69	2.18	5.65	88.9
DIOXINS AND FURANS																
P97CDD	HEPTACHLORODIBENZODIOXIN	ng/L	1	4.30	4.30	2	1	50.0	11	1	9.1	0.93	1.19	8.75	4.01	11.1
P96CDD	OCTACHLORODIBENZODIOXIN	ng/L	1	11.00	11.00	2	1	50.0	11	3	27.3	1.48	1.87	17.01	4.46	33.3
PESTICIDES,HERBICIDES,PCBS																
P1PCBT	PCB, TOTAL	ug/L	2	0.14	3.70	10	9	90.0	44	27	61.4	0.88	0.77	3.86	7.58	77.8

PLANT NAME : Toronto (Humber)
PLANT TYPE : Secondary

SAMPLING TYPE : Recycle
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	PLANT MIN. CONC. > MDL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
PESTICIDES,HERBICIDES,PCBS																
P24D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	0.17	11.00	10	7	70.0	44	29	65.9	0.75	0.79	4.47	5.21	88.9
P1PPDE	PP-DDE	ug/L	1	0.07	0.50	10	5	50.0	44	17	38.6	0.17	0.07	2.13	3.59	55.6
P245T	2,4,5-TRICLORPHENOXYACETIC ACID	ug/L	3	0.18	2.50	10	5	50.0	44	18	40.9	0.46	0.43	2.05	4.50	77.8
X2124	1,2,4-TRICHLOROBENZENE	ug/L	3	0.27	2.30	10	4	40.0	44	15	34.1	0.24	0.11	3.53	4.17	44.4
X2HCB	HEXACHLOROBENZENE	ug/L	2	0.11	0.70	10	4	40.0	44	12	27.3	0.15	0.07	1.95	4.31	66.7
P1BHCG	GAMMA-BHC(HEXCHLORCYCLHEXANE)	ug/L	2	0.40	0.80	10	3	30.0	44	17	38.6	0.16	0.08	2.23	2.57	66.7
P1END2	ENDOSULFAN II	ug/L	3	0.30	0.90	10	2	20.0	44	2	4.6	0.14	0.05	2.10	3.22	11.1
P1ENDR	ENDRIN	ug/L	3	0.20	0.70	10	2	20.0	44	3	6.8	0.13	0.06	1.88	3.22	22.2
P1HEPT	HEPTACHLOR	ug/L	3	0.30	0.80	10	2	20.0	44	9	20.5	0.14	0.07	2.03	3.83	44.4
P35ILV	SILVEX	ug/L	3	0.24	0.82	10	2	20.0	44	15	34.1	0.31	0.38	2.72	5.08	66.7
X1HCCP	HEXACHLOROCYCLOPENTADIENE	ug/L	3	3.00	3.80	10	2	20.0	44	6	13.6	1.28	0.48	1.68	3.21	44.4
P1ALDR	ALDRIN	ug/L	1	0.20	0.20	10	1	10.0	44	6	13.6	0.11	0.06	1.25	3.46	33.3
P1BHCA	ALPHA-BHC(HEXCHLORCYCLHEXANE)	ug/L	1	0.30	0.30	10	1	10.0	44	7	15.9	0.11	0.06	1.42	2.50	33.3
P1BHCB	BETA-BHC (HEXCHLORCYCLHEXANE)	ug/L	1	1.70	1.70	10	1	10.0	44	10	22.7	0.13	0.08	2.45	2.84	55.6
P1CHLA	ALPHA-CHLORDANE	ug/L	1	0.40	0.40	10	1	10.0	44	11	25.0	0.11	0.06	1.55	2.96	55.6
P1DMDT	METHOXYCHLOR	ug/L	1	5.00	5.00	10	1	10.0	44	7	15.9	0.63	0.32	2.07	2.82	44.4
P1END1	ENDOSULFAN I	ug/L	3	0.80	0.80	10	1	10.0	44	3	6.8	0.12	0.06	1.93	3.33	33.3
P1HEPE	HEPTACHLOR/EPOXIDE	ug/L	2	1.00	1.00	10	1	10.0	44	3	6.8	0.13	0.06	2.07	3.11	33.3
P1PPDD	PP-DDD	ug/L	1	0.20	0.20	10	1	10.0	44	10	22.7	0.11	0.05	1.25	2.86	66.7
VOLATILES ORGANIC COMPOUNDS																
B2STYR	STYRENE	ug/L	1	100.00	220.00	10	2	20.0	44	2	4.6	29.86	20.65	2.38	1.81	11.1

PLANT NAME : Toronto (Humber)
PLANT TYPE : Secondary

SAMPLING TYPE : Raw Sludge
SAMPLE FORM : Dry Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS (DRY WEIGHT)	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
COD	CHEMICAL OXYGEN DEMAND	mg/kg	0	140845.07	1432240.44	2	2	100.0	45	45	100.0	449136.96	892221.45	5.16	3.19	100.0
NNHTHR	AMMONIUM,TOTAL FIL.T.REAC.	mg/kg	0	4591.55	6202.19	2	2	100.0	48	47	97.9	5336.44	5911.32	1.24	4.59	100.0
NNOTPR	NITRATES,TOTAL FIL.T.REAC.	mg/kg	0	18.31	23.22	2	2	100.0	48	43	89.6	20.62	25.44	1.18	2.21	93.9
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/kg	0	46478.87	49180.33	2	2	100.0	51	51	100.0	47810.52	36897.85	1.04	2.98	100.0
PH	(-LOG(H+(CONCN))	mg/kg	0	5.50	5.93	2	2	100.0	49	49	100.0	5.71	6.03	1.05	1.10	100.0
PHNOL	PHENOLICS (4AAP)	mg/kg	0	62.84	101.41	2	2	100.0	50	41	82.0	79.83	82.34	1.40	3.54	85.3
PPUT	PHOSPHORUS,UNFIL.T.TOTAL.	mg/kg	0	18579.24	21633.80	2	2	100.0	42	42	100.0	20048.43	20347.70	1.11	4.43	100.0
RST	RESIDUE, TOTAL.	mg/kg	0	35500.00	36600.00	2	2	100.0	51	51	100.0	36045.80	32783.51	1.02	1.81	100.0
RSTLOI	RESIDUE,TOT.LOSS ON IGNI.	mg/kg	0	23800.00	28000.00	2	2	100.0	51	51	100.0	25814.72	20803.05	1.12	1.77	100.0
METALS																
AGUT	SILVER,UNFIL.T.TOTAL.	mg/kg	0	61.97	68.31	2	2	100.0	45	40	88.9	65.06	30.17	1.07	2.61	84.4
ALUT	ALUMINUM,UNFIL.T.TOTAL.	mg/kg	0	5915.49	7650.27	2	2	100.0	51	51	100.0	6727.19	9835.74	1.20	2.51	100.0
ASUT	ARSENIC,UNFIL.T.TOTAL.	mg/kg	0	2.25	3.28	2	2	100.0	51	50	98.0	2.72	6.13	1.30	2.01	97.1
CDUT	CADMIUM,UNFIL.T.TOTAL.	mg/kg	0	45.07	98.36	2	2	100.0	43	40	93.0	66.58	9.74	1.74	4.35	90.0
CRUT	CHROMIUM,UNFIL.T.TOTAL.	mg/kg	0	816.90	956.28	2	2	100.0	51	50	98.0	883.85	301.43	1.12	3.68	97.1
CUUT	COPPER,UNFIL.T.TOTAL.	mg/kg	0	830.60	873.24	2	2	100.0	46	46	100.0	851.65	606.31	1.04	1.72	100.0
HGUT	MERCURY,UNFIL.T.TOTAL.	mg/kg	0	1.91	2.54	2	2	100.0	50	50	100.0	2.20	2.23	1.22	1.67	100.0
NIUT	NICKEL,UNFIL.T.TOTAL.	mg/kg	0	114.75	140.85	2	2	100.0	46	44	95.7	127.13	59.17	1.16	2.90	93.3
PBUT	LEAD,UNFIL.T.TOTAL.	mg/kg	0	213.11	236.62	2	2	100.0	49	48	98.0	224.56	173.99	1.08	2.24	96.9
SEUT	SELENIUM,UNFIL.T.TOTAL.	mg/kg	0	1.97	2.46	2	2	100.0	50	48	96.0	2.20	3.04	1.17	1.93	93.9
SRUT	STRONTIUM,UNFIL.T.TOTAL.	mg/kg	0	112.68	123.50	2	2	100.0	51	51	100.0	117.96	231.70	1.07	1.97	100.0
ZNUT	ZINC,UNFIL.T.TOTAL.	mg/kg	0	2816.90	4644.81	2	2	100.0	51	51	100.0	3617.18	905.39	1.42	2.39	100.0
MOUT	MOLYBDENUM,UNFIL.T.TOTAL.	mg/kg	0	11.20	11.20	2	1	50.0	37	23	62.2	3.97	5.80	4.33	2.88	64.3
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PMMCRE	M-CRESOL	ug/kg	1	155737.70	281690.10	2	2	100.0	51	42	82.3	209451.10	116847.30	1.52	12.16	85.3
PMBBP	BUTYLBENZYLPHTHALATE	ug/kg	1	17087.40	17087.40	2	1	50.0	51	4	7.8	6937.80	3445.60	3.58	2.25	11.8
PMDPE	DIPHENYL ETHER	ug/kg	1	14788.70	14788.70	2	1	50.0	51	1	2.0	10050.70	7296.10	1.73	1.81	2.9
DIOXINS AND FURANS																
P8CDD	OCTACHLORODIBENZODIOXIN	ug/kg	1	3.70	3.70	2	1	50.0	50	25	50.0	3.20	8.50	1.25	3.60	58.8
PESTICIDES,HERBICIDES,PCBS																
P1PCBT	PCB, TOTAL	ug/kg	2	31.00	120.20	2	2	100.0	51	40	78.4	61.00	88.70	2.61	3.18	79.4
P3245T	2,4,5-TRICLORPHENOXYACETIC ACID	ug/kg	3	56.30	183.10	2	2	100.0	51	21	41.2	101.50	48.90	2.30	3.49	47.1
P3SILV	SILVEX	ug/kg	3	112.70	437.20	2	2	100.0	51	23	45.1	222.00	47.30	2.61	3.40	55.9
P1BHCG	GAMMA-BHC(HEXACHLORCYCLOHEXANE)	ug/kg	2	19.10	19.10	2	1	50.0	51	28	54.9	7.30	8.90	3.89	2.69	67.7
P1CHLG	GAMMA-CHLORDANE	ug/kg	1	8.20	8.20	2	1	50.0	51	19	37.3	4.80	6.00	2.14	2.44	50.0
P1OCHL	OXYCHLORDANE	ug/kg	2	5.50	5.50	2	1	50.0	51	8	15.7	3.90	4.50	1.61	2.27	20.6
P24D	2,4-DICHLOROPHENOXYACETIC ACID	ug/kg	3	166.70	166.70	2	1	50.0	51	38	74.5	30.60	93.20	11.02	6.50	82.3
X2HCB	HEXACHLOROBENZENE	ug/kg	2	13.70	13.70	2	1	50.0	51	17	33.3	6.20	5.60	3.07	2.65	38.2

PLANT NAME : Toronto (Humber)
PLANT TYPE : Secondary

SAMPLING TYPE : Raw Sludge
SAMPLE FORM : Dry Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS (DRY WEIGHT)	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
VOLATILE ORGANIC COMPOUNDS																
B2EBNZ	ETHYLBENZENE (C8H10)	ug/kg	1	1939.90	1939.90	2	1	50.0	51	10	19.6	1045.40	890.70	2.40	2.60	26.5
B2MPXY	M-, AND P-XYLENES	ug/kg	1	1776.00	1776.00	2	1	50.0	51	16	31.4	1000.30	1345.90	2.25	3.86	41.2
B2STYR	STYRENE (C8H8)	ug/kg	1	6010.90	6010.90	2	1	50.0	51	1	2.0	1840.30	639.40	5.33	1.96	2.9

PLANT NAME : Toronto (Humber)
PLANT TYPE : Secondary

SAMPLING TYPE : TreatedSludge
SAMPLE FORM : Dry Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QA/QC (DRY WEIGHT)	CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																	
COD	CHEMICAL OXYGEN DEMAND	mg/kg	0		285714.29	286497.89	2	2	100.0	36	36	100.0	286105.82	508097.94	1.00	4.65	100.0
NNITFR	AMMONIUM,TOTAL,FIL.T.REAC.	mg/kg	0		38228.57	39873.42	2	2	100.0	25	25	100.0	39042.33	17658.28	1.03	2.92	100.0
NNOTHR	NITRATES,TOTAL,FIL.T.REAC.	mg/kg	0		68.57	101.27	2	2	100.0	26	23	88.5	83.33	42.68	1.32	2.29	95.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/kg	0		81714.29	86497.89	2	2	100.0	49	49	100.0	84072.07	38494.12	1.04	1.77	100.0
PH	(-LOG(H+(CONCN))	mg/kg	0		6.70	7.78	2	2	100.0	47	47	100.0	7.22	7.17	1.11	1.09	100.0
PHNOL	PHENOLICS (4AAP)	mg/kg	0		50.63	80.00	2	2	100.0	49	41	83.7	63.64	43.05	1.38	3.14	87.9
PPUT	PHOSPHORUS,UNFIL.T.TOTAL.	mg/kg	0		28571.43	38607.59	2	2	100.0	43	43	100.0	33212.56	76638.67	1.24	6.91	100.0
RST	RESIDUE, TOTAL.	mg/kg	0		17500.00	23700.00	2	2	100.0	50	50	100.0	20365.41	80434.04	1.24	3.23	100.0
RSTLOI	RESIDUE,TOT.LOSS ON IGNI.	mg/kg	0		10500.00	14900.00	2	2	100.0	50	50	100.0	12508.00	43379.33	1.28	3.19	100.0
METALS																	
AGUT	SILVER,UNFIL.T.TOTAL.	mg/kg	0		74.29	96.62	2	2	100.0	44	44	100.0	84.72	37.78	1.20	2.33	100.0
ALUT	ALUMINUM,UNFIL.T.TOTAL.	mg/kg	0		6285.71	10970.46	2	2	100.0	50	50	100.0	8304.05	10715.94	1.48	2.82	100.0
ASUT	ARSENIC,UNFIL.T.TOTAL.	mg/kg	0		4.00	5.49	2	2	100.0	50	49	98.0	4.68	5.40	1.25	2.06	97.1
CDUT	CADMIUM,UNFIL.T.TOTAL.	mg/kg	0		62.86	126.58	2	2	100.0	45	41	91.1	89.20	10.47	1.64	3.98	90.3
CRUT	CHROMIUM,UNFIL.T.TOTAL.	mg/kg	0		971.43	1814.35	2	2	100.0	50	50	100.0	1327.59	333.06	1.56	3.59	100.0
CUUT	COPPER,UNFIL.T.TOTAL.	mg/kg	0		1257.14	1361.60	2	2	100.0	45	45	100.0	1308.33	732.24	1.06	2.16	100.0
HGUT	MERCURY,UNFIL.T.TOTAL.	mg/kg	0		2.29	3.80	2	2	100.0	50	49	98.0	2.95	3.24	1.43	2.04	97.1
NIUT	NICKEL,UNFIL.T.TOTAL.	mg/kg	0		142.86	215.19	2	2	100.0	45	42	93.3	175.33	72.95	1.34	2.95	90.0
PBUT	LEAD,UNFIL.T.TOTAL.	mg/kg	0		245.71	333.33	2	2	100.0	50	49	98.0	286.19	198.62	1.24	2.46	97.1
SEUT	SELENIUM,UNFIL.T.TOTAL.	mg/kg	0		4.00	5.06	2	2	100.0	50	48	96.0	4.50	2.67	1.18	2.98	97.1
SRUT	STRONTIUM,UNFIL.T.TOTAL.	mg/kg	0		165.71	200.00	2	2	100.0	50	50	100.0	182.05	240.93	1.14	2.54	100.0
ZNUT	ZINC,UNFIL.T.TOTAL.	mg/kg	0		3771.43	5907.17	2	2	100.0	50	50	100.0	4720.01	988.90	1.37	2.57	100.0
COUT	COBALT,UNFIL.T.TOTAL.	mg/kg	0		5.49	5.49	2	1	50.0	39	32	82.1	2.80	9.14	2.59	2.75	85.7
MOUT	MOLYBDENUM,UNFIL.T.TOTAL.	mg/kg	0		19.83	19.83	2	1	50.0	34	23	67.7	7.53	6.41	3.94	2.84	69.2
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																	
PMDPE	DIPHENYL ETHER	ug/kg	1		30000.00	30000.00	2	1	50.0	50	2	4.0	17789.20	3222.10	2.09	3.37	5.9
DIOXINS AND FURANS																	
P8CDD	OCTACHLORODIBENZODIOXIN	ug/kg	1		8.90	8.90	2	1	50.0	49	26	53.1	5.10	7.10	2.21	3.84	64.7
PESTICIDES,HERBICIDES,PCBS																	
P1PCBT	PCB, TOTAL	ug/kg	2		91.40	105.50	2	2	100.0	50	32	64.0	98.20	114.10	1.11	4.58	67.7
P1PPDE	PP-DDE	ug/kg	1		17.10	25.30	2	2	100.0	50	34	68.0	20.80	11.10	1.32	2.72	73.5
P3245T	2,4,5-TRICHLORPHENOXYACETIC ACID	ug/kg	3		62.90	400.80	2	2	100.0	50	16	32.0	158.80	84.40	3.70	3.13	41.2
P1BHCG	GAMMA-BHC(HEXACHLORCYCLOHEXANE)	ug/kg	2		8.40	8.40	2	1	50.0	50	12	24.0	6.90	5.70	1.32	3.13	35.3
P1CHLA	ALPHA-CHLORDANE	ug/kg	1		11.40	11.40	2	1	50.0	50	22	44.0	6.90	6.50	2.03	2.41	55.9
P1OCHL	OXYCHLORDANE	ug/kg	2		12.70	12.70	2	1	50.0	50	6	12.0	8.50	4.20	1.76	2.24	17.7
P24D	2,4-DICHLOROPHENOXYACETIC ACID	ug/kg	3		1012.70	1012.70	2	1	50.0	50	25	50.0	107.40	75.00	23.87	5.81	64.7
P3SILV	SILVEX	ug/kg	3		257.40	257.40	2	1	50.0	50	18	36.0	85.80	92.70	4.73	2.94	44.1
X2124	1,2,4-TRICHLOROBENZENE	ug/kg	3		54.90	54.90	2	1	50.0	50	22	44.0	17.70	14.80	4.96	5.02	52.9
X2HCB	HEXACHLOROBENZENE	ug/kg	2		21.10	21.10	2	1	50.0	50	21	42.0	11.00	7.00	2.52	2.96	55.9

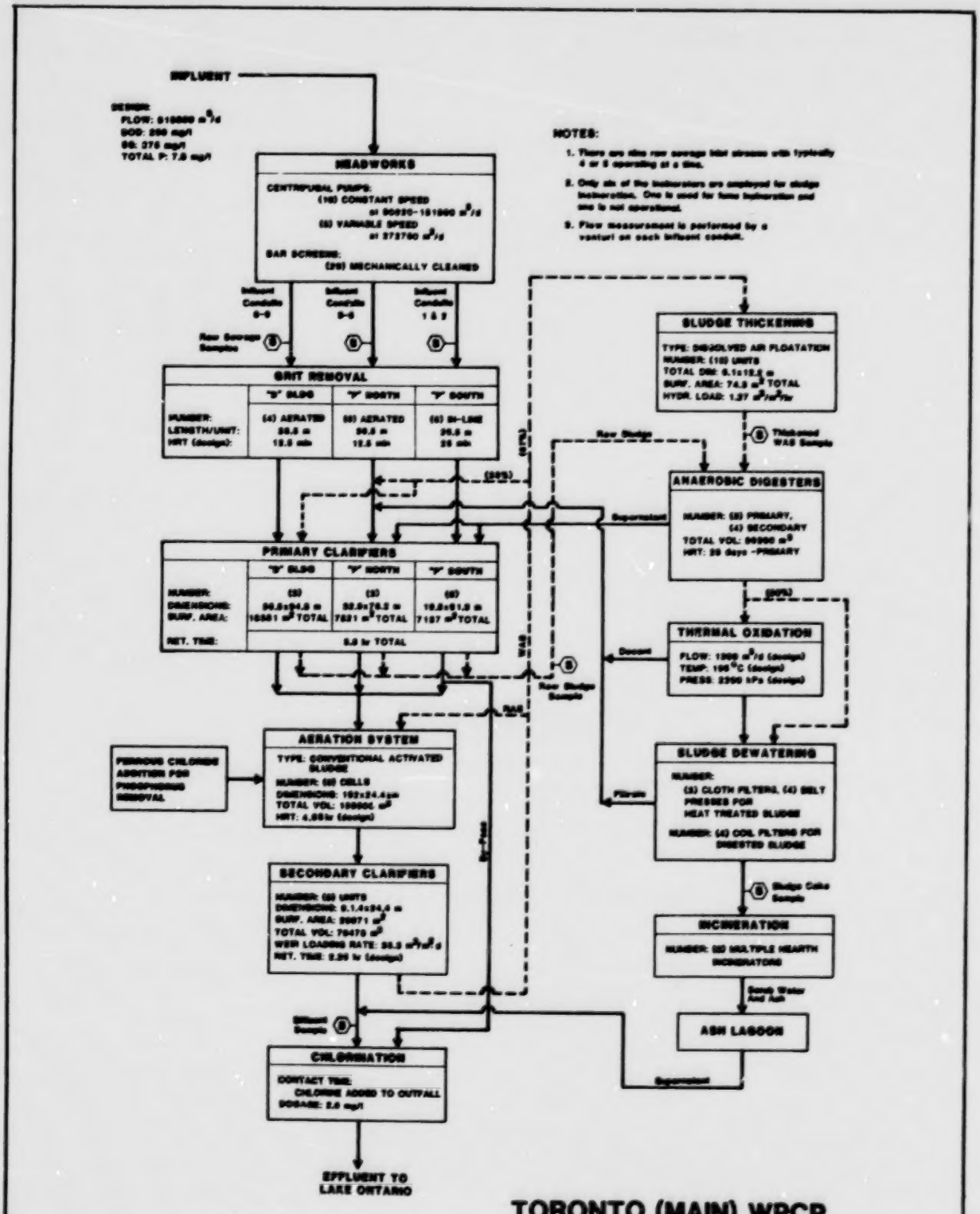
Sub-Appendix A-31

Toronto (Main) WPCP

Contents:

- Plant Schematic with Design Characteristics
- Annual Data Review (1981 - 1986 Plant Performance)
- Sources of Municipal Water Pollution Control Plant Raw Sewage
- Operational Evaluation for Toronto (Main) WPCP
- Analytical Data

(KIR18/28A)



TORONTO (MAIN) WPCP

MAIN WPCP (TORONTO)
Conventional Activated Sludge
Phosphorus Removal - Continuous
Capacity - 818.28 10(3)m3/day

PARAMETER	1981	1982	1983	1984	1985	5 YEAR AVERAGE 81-85
Avg. Daily Flow (1000 m3/day)	752.36	789.10	737.59	677.25	683.83	712.04
BOD5 - Influent (mg/L)	197.00	206.00	224.00	215.42	167.00	202.20
BOD5 - Effluent (mg/L)	7.10	11.60	13.20	19.33	22.33	14.71
Annual BOD5 Significantly Different from Mean Annual Average BOD5?	I.D.	I.D.	I.D.	I.D.	I.D.	
TSS - Influent (mg/L)	204.30	227.90	260.00	228.25	195.67	223.22
TSS - Effluent (mg/L)	11.70	13.90	11.83	11.92	26.00	15.07
Annual TSS Significantly Different from Mean Annual Average TSS?	I.D.	I.D.	I.D.	I.D.	I.D.	
Total P - Influent (mg/L)	5.80	6.40	5.93	5.80	5.85	5.97
Total P - Effluent (mg/L)	0.80	0.91	0.89	0.97	1.09	0.93
Annual TP Significantly Different from Mean Annual Average TP?	I.D.	I.D.	I.D.	I.D.	I.D.	
TP in Compliance?	Y	Y	Y	Y	N	Y

I.D. - Insufficient Data

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SOURCES OF MUNICIPAL WATER POLLUTION CONTROL PLANT RAW SEWAGE

GENERAL DESCRIPTION OF WATER POLLUTION CONTROL PLANT (WPCP)

NAME OF WPCP	MAIN WPCP
WORKS NUMBER	120000391
TREATMENT TYPE	CONVENTIONAL ACTIVATED SLUDGE PHOSPHORUS REMOVAL CONTINUOUS
DESIGN CAPACITY (1000 m3/d)	818.280
1986 AVERAGE DAY FLOW (1000 m3/d)	976.492
POPULATION SERVED	1200000

% OF TOTAL FLOW ATTRIBUTED TO:

INDUSTRIAL SOURCES (%)	8
COMMERCIAL SOURCES (%) (Population x 0.0757)	9
RESIDENTIAL SOURCES (%) (Population x 0.175)	22
UNACCOUNTED FOR, INCL. INFILTRATION (100-% Contributed from industrial, commercial and residential sources)	61

PROFILE OF INDUSTRIES IN CATCHMENT

TOTAL NO OF INDUSTRIES	2488
INDUSTRIES WITH WATER	1993
NO OF SIC CATEGORIES	63

DESCRIPTION OF THE TOP 5 INDUSTRIES DISCHARGED TO THE WPCP (BASED ON WATER USE DATA)

DESCRIPTION	SIC	# OF COMPANIES
PRINTING AND PUBLISHING	2700-2799	493
BEVERAGES	2082-2089	20
APPAREL & OTHR TEXTILES PRODUCTS	2311-2399	318
TRANSPORTATION EQUIPMENT	3711-3799	22
PHARMACEUTICAL MFG	2830-2834	16

R

OPERATIONAL EVALUATION FOR: T O R O N T O M A I N W P C P

TREATMENT FACILITY: Secondary
PERIOD ENDING: January 31,1987
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: 818,300 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
RAW SEWAGE FLOW	770,000	772,000	838,000	888,000	704,000	594,000	579,000
% of Design Flow	94.10%	94.34%	102.41%	108.52%	86.03%	72.59%	70.76%
Influent BOD (mg/L)	179	169	185	169			146
Primary BOD (mg/L)	204	209	219	223			227
Secondary BOD (mg/L)	7	8	7	9			5
% PRIMARY REMOVAL	-14.0	-23.7	-18.4	-32.0			-55.5
% SECONDARY REMOVAL	96.1	95.3	96.2	94.7			96.6
Influent SS (mg/L)	258	257	249	267	221	225	265
Primary SS (mg/L)	522	343	478	541	459	459	609
Secondary SS (mg/L)	20	17	14	16	13	15	14
% PRIMARY REMOVAL	-102.3	-33.5	-92.0	-102.6	-107.7	-104.0	-129.8
% SECONDARY REMOVAL	92.2	93.4	94.4	94.0	94.1	93.3	94.7
Influent NH4 (mg/L)							
Primary NH4 (mg/L)	21.1	17.9	13.1	18.1	20.2	25.8	
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)	29.9	34.8	23.5	26.8	27.1	27.1	
Primary TKN (mg/L)	26.3	25.4	21.0	23.2			
Secondary TKN (mg/L)							
% PRIMARY REMOVAL	12.0	27.0	10.6	13.4			
% SECONDARY REMOVAL							
Influent Total P (mg/L)	5.7	5.0	5.4	5.6	5.1	5.7	5.7
Primary Total P (mg/L)	0.50	0.40	0.40	0.40	0.50	0.50	0.40
Secondary Total P (mg/L)							
% PRIMARY REMOVAL	91.2	92.0	92.6	92.9	90.2	91.2	93.0
% SECONDARY REMOVAL							

OPERATIONAL EVALUATION FOR: TORONTO MAIN WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: January 31,1987
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: 818,300 m3/d

PARAMETER	PRE-SAMPLING PERIOD						
	DAY 8	DAY 9	DAY 10	DAY 11	DAY 12	DAY 13	DAY 14
RAW SEWAGE FLOW	603,000		636,000	649,000	709,000	606,000	559,000
% of Design Flow	73.69%		77.72%	79.31%	86.64%	74.06%	68.31%
Influent BOD (mg/L)	134	186	174	142			146
Primary BOD (mg/L)	222	228	227	239			264
Secondary BOD (mg/L)	7	7	7	8			10
% PRIMARY REMOVAL	-65.7	-22.6	-30.5	-68.3			-80.8
% SECONDARY REMOVAL	94.8	96.2	96.0	94.4			93.2
Influent SS (mg/L)	259	322	231	253	233	239	183
Primary SS (mg/L)	686	763	495	533	607	607	584
Secondary SS (mg/L)	18	19	17	20	26	19	18
% PRIMARY REMOVAL	-164.9	-137.0	-114.3	-110.7	-160.5	-154.0	-219.1
% SECONDARY REMOVAL	93.1	94.1	92.6	92.1	88.8	92.1	90.2
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)	19.3	20.0			16.2		
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)	26.5	32.5			26.9		
Primary TKN (mg/L)							
Secondary TKN (mg/L)	26.3	27.1			25.7		
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	0.8	16.6			4.5		
Influent Total P (mg/L)	5.7	6.9	5.4	5.8	5.8	5.4	5.2
Primary Total P (mg/L)							
Secondary Total P (mg/L)	0.50	0.50	0.50	0.60	0.50	0.60	0.50
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	91.2	92.8	90.7	89.7	91.4	88.9	90.4

OPERATIONAL EVALUATION FOR: TORONTO MAIN WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: January 31,1987
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: 818,300 m3/d

PARAMETER	SAMPLING PERIOD						
	DAY 15	DAY 16	DAY 17	DAY 18	DAY 19	DAY 20	DAY 21
RAW SEWAGE FLOW	696,000	750,000	734,000	758,000	845,000	726,000	
% of Design Flow	85.05%	91.65%	89.70%	92.63%	103.26%	88.72%	
Influent BOD (mg/L)	114	212	145	148			
Primary BOD (mg/L)	215	220	353	299			
Secondary BOD (mg/L)	9	10	7	8			
% PRIMARY REMOVAL	-88.6	-3.8	-143.4	-102.0			
% SECONDARY REMOVAL	92.1	95.3	95.2	94.6			
Influent SS (mg/L)	245	296	170	204	264	262	
Primary SS (mg/L)	380	416	915	234	597	547	
Secondary SS (mg/L)	21	20	23	21	15	15	
% PRIMARY REMOVAL	-55.1	-40.5	-438.2	-14.7	-126.1	-108.8	
% SECONDARY REMOVAL	91.4	93.2	86.5	89.7	94.3	94.3	
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)			20.2	21.2	24.2		
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)		31.7	31.7	25.6			
Primary TKN (mg/L)							
Secondary TKN (mg/L)		25.6	29.3	29.2			
% PRIMARY REMOVAL							
% SECONDARY REMOVAL		19.2	7.6	-14.1			
Influent Total P (mg/L)	6.7	10.0	6.9	5.5	7.4	6.8	
Primary Total P (mg/L)							
Secondary Total P (mg/L)	0.50	0.60	0.50	0.50	0.60	0.40	
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	92.5	94.0	92.8	90.9	91.9	94.1	

OPERATIONAL EVALUATION FOR: TORONTO MAIN WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: June 21,1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 818,300 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
RAW SEWAGE FLOW	859,000	826,000	815,000	750,000			
% of Design Flow	104.97%	100.94%	99.60%	91.65%			
Influent BOD (mg/L)	150	176	192	225			165
Primary BOD (mg/L)	197	151	240	302			220
Secondary BOD (mg/L)	23	26	17	25			15
% PRIMARY REMOVAL	-31.3	14.2	-25.0	-34.2			-33.3
% SECONDARY REMOVAL	84.7	85.2	91.1	88.9			90.9
Influent SS (mg/L)	196	300	376	304	430	430	328
Primary SS (mg/L)	610	238	270	536	369	369	267
Secondary SS (mg/L)	73	92	27	28	31	19	14
% PRIMARY REMOVAL	-211.2	20.7	28.2	-76.3	14.2	14.2	18.6
% SECONDARY REMOVAL	62.8	69.3	92.8	90.8	92.8	95.6	95.7
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)	16.0	16.0	16.7	18.6	22.9		
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)	27.8	30.5	34.7	33.1	33.3		
Primary TKN (mg/L)							
Secondary TKN (mg/L)	22.2	22.9	25.0	23.6	26.4		
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	20.1	24.9	28.0	28.7	20.7		
Influent Total P (mg/L)	5.4	6.2	6.9	6.7	7.3	4.9	6.8
Primary Total P (mg/L)							
Secondary Total P (mg/L)	1.80	2.10	0.70	0.80	0.80	0.50	0.40
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	66.7	66.1	89.9	88.1	89.0	89.8	94.1

OPERATIONAL EVALUATION FOR: T O R O N T O M A I N W P C P

TREATMENT FACILITY: Secondary
PERIOD ENDING: June 21,1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 818,300 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 8	DAY 9	DAY 10	DAY 11	DAY 12	DAY 13	DAY 14
RAW SEWAGE FLOW				693,000	851,000	756,000	723,000
% of Design Flow				84.69%	104.00%	92.39%	88.35%
Influent BOD (mg/L)	188	265	193	185			138
Primary BOD (mg/L)	260	265	200	276			136
Secondary BOD (mg/L)	13	23	30	15			14
% PRIMARY REMOVAL	-38.3	0.0	-3.6	-49.2			1.4
% SECONDARY REMOVAL	93.1	91.3	84.5	91.9			89.9
Influent SS (mg/L)	327	449	482	300	175	142	138
Primary SS (mg/L)	389	391	634	624	471	471	220
Secondary SS (mg/L)	19	19	14	13	4	4	19
% PRIMARY REMOVAL	-19.0	12.9	-31.5	-108.0	-169.1	-231.7	-59.4
% SECONDARY REMOVAL	94.2	95.8	97.1	95.7	97.7	97.2	86.2
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)	23.6	23.6	25.0	23.6	22.2		
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)	31.9	44.4	44.4	40.3	31.9		
Primary TKN (mg/L)							
Secondary TKN (mg/L)	27.1	26.4	26.4	27.8	23.6		
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	15.0	40.5	40.5	31.0	26.0		
Influent Total P (mg/L)	6.7	8.5	8.6	7.5	5.4	5.3	5.2
Primary Total P (mg/L)							
Secondary Total P (mg/L)	0.60	0.60	0.40	0.40	0.40	0.50	0.60
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	91.0	92.9	95.3	94.7	92.6	90.6	88.5

OPERATIONAL EVALUATION FOR: TORONTO MAIN WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: June 21,1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 818,300 m3/d

PARAMETER	SAMPLING PERIOD						
	DAY 15	DAY 16	DAY 17	DAY 18	DAY 19	DAY 20	DAY 21
RAW SEWAGE FLOW	856,000	926,000	884,000	855,000	796,000	726,000	876,000
% of Design Flow	104.61%	113.16%	108.03%	104.48%	97.27%	88.72%	107.05%
Influent BOD (mg/L)	240	211	277	202			151
Primary BOD (mg/L)	289	243	299	293			234
Secondary BOD (mg/L)	36	22	17	15			14
% PRIMARY REMOVAL	-20.4	-15.2	-7.9	-45.0			-55.0
% SECONDARY REMOVAL	85.0	89.6	93.9	92.6			90.7
Influent SS (mg/L)	230	223	363	268	241	244	251
Primary SS (mg/L)	579	334	492	244	525	525	515
Secondary SS (mg/L)	17	38	20	36	20	20	22
% PRIMARY REMOVAL	-151.7	-49.8	-35.5	9.0	-117.8	-115.2	-105.2
% SECONDARY REMOVAL	92.6	83.0	94.5	86.6	91.7	91.8	91.2
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)	23.6	23.6	22.2		22.2		
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)	38.9	38.9	38.9		38.9		
Primary TKN (mg/L)							
Secondary TKN (mg/L)	27.8	25.0	27.8		25.0		
% PRIMARY REMOVAL	100.0	100.0	100.0		100.0		
% SECONDARY REMOVAL	28.5	35.7	28.5		35.7		
Influent Total P (mg/L)	7.2	5.9	8.0	5.8	8.7	7.4	5.6
Primary Total P (mg/L)							
Secondary Total P (mg/L)	0.50	0.90	0.60	0.60	0.50	0.70	0.50
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	93.1	84.7	92.5	89.7	94.3	90.5	91.1

PLANT NAME : Toronto (Main)
PLANT TYPE : Secondary

SAMPLING TYPE : Raw Sewage
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	PLANT MIN. CONC. > MDL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0	122.00	301.00	10	10	100.0	267	266	99.6	228.21	140.23	1.31	1.93	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0	96.00	598.00	10	10	100.0	260	258	99.2	372.90	287.75	1.68	1.82	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0	17.80	37.00	10	10	100.0	271	271	100.0	28.90	22.39	1.25	1.81	100.0
NNHTFR	AMMONIUM,TOTAL FILT.REAC.	mg/L	0	16.50	23.20	10	10	100.0	275	274	99.6	19.77	15.37	1.12	1.69	100.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0	29.00	46.50	10	10	100.0	273	273	100.0	36.49	25.44	1.13	1.47	100.0
PH	(-LOG(H+(CONCN))		0	6.77	7.61	10	10	100.0	275	275	100.0	6.98	6.90	1.03	1.05	100.0
PFUT	PHOSPHORUS,UNFILT.TOTAL	mg/L	0	5.39	7.13	6	6	100.0	248	248	100.0	6.58	5.18	1.11	1.51	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0	175.00	284.00	10	10	100.0	267	266	99.6	209.87	126.88	1.16	1.93	100.0
RSPLOI	RESIDUE,PAR.LOSS ON IGNI.	mg/L	0	126.00	222.00	5	5	100.0	90	89	98.9	151.79	100.84	1.25	1.78	100.0
NNO2FR	NITRITE,FILT. REACT.	mg/L	0	0.03	0.03	10	3	30.0	271	58	21.4	0.01	0.01	2.77	2.98	51.4
PHNOL	PHENOLICS (4AAP)	mg/L	0	1.10	1.10	10	1	10.0	275	37	13.5	0.25	0.31	2.07	2.05	37.8
METALS																
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	1200.00	4130.00	11	11	100.0	322	306	95.0	1890.00	1000.10	1.44	2.65	97.3
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	140.00	340.00	11	11	100.0	322	257	73.6	220.00	51.10	1.40	3.44	89.2
CUUT	COPPER,UNFILT.TOTAL	ug/L	0	90.00	170.00	2	2	100.0	49	48	98.0	120.00	110.60	1.57	2.28	97.1
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	200.00	320.00	11	11	100.0	319	318	99.7	230.00	370.70	1.14	2.14	100.0
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	260.00	630.00	11	11	100.0	322	315	97.8	420.00	211.00	1.41	2.94	100.0
NIUT	NICKEL,UNFILT.TOTAL	ug/L	0	50.00	140.00	11	10	90.9	322	103	32.0	80.00	38.80	1.68	2.70	54.1
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	0.23	0.80	10	9	90.0	283	274	96.8	0.47	0.23	1.57	2.11	100.0
CDUT	CADMIUM,UNFILT.TOTAL	ug/L	0	10.00	10.00	11	4	36.4	322	76	23.6	10.00	6.50	2.18	2.09	70.3
CCNPUR	CYANIDE-FREE,UNFILT.REAC.	ug/L	0	0.00	20.00	10	3	30.0	271	82	30.3	0.00	1.90	2.39	6.88	32.4
PBUT	LEAD,UNFILT.TOTAL	ug/L	0	80.00	110.00	11	2	18.2	322	57	17.7	60.00	59.50	1.59	1.86	51.4
AGUT	SILVER,UNFILT.TOTAL	ug/L	0	30.00	30.00	11	1	9.1	321	82	25.6	20.00	10.40	3.00	2.55	75.7
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PM4CRE	M-CRESOL	ug/L	1	44.50	159.50	10	8	80.0	275	167	60.7	50.64	25.59	2.93	3.45	86.5
PMPHEN	PHENOL	ug/L	2	15.90	103.80	10	8	80.0	275	118	42.9	32.00	14.52	2.56	2.46	78.4
PMBBP	BUTYLBENZYLPHTHALATE	ug/L	1	12.40	26.40	10	5	50.0	275	34	12.4	9.23	5.85	1.99	1.66	37.8
PM2CRE	O-CRESOL	ug/L	2	15.30	24.40	10	3	30.0	275	6	2.2	9.99	7.72	1.61	1.39	8.1
PNNAPH	NAPHTHALENE	ug/L	1	14.00	18.70	10	3	30.0	275	16	5.8	7.05	5.37	1.75	1.47	21.6
PESTICIDES,HERBICIDES,PCBS																
X2124	1,2,4-TRICHLOROBENZENE	ug/L	3	0.17	2.26	10	9	90.0	276	35	12.7	0.27	0.01	4.06	2.48	40.5
P1BHCG	GAMMA-BHC(HEXCHLORCYCLHEXANE)	ug/L	2	0.02	0.05	10	8	80.0	276	143	51.8	0.03	0.02	1.91	2.29	94.6
P324D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	0.05	0.45	10	8	80.0	276	214	77.5	0.09	0.13	2.89	3.72	100.0
P1PCBT	PCB, TOTAL	ug/L	2	0.08	0.27	10	4	40.0	276	42	15.2	0.07	0.06	2.19	2.31	46.0
P1HEPT	HEPTACHLOR	ug/L	3	0.03	0.05	10	3	30.0	276	10	3.6	0.01	0.01	1.87	1.48	18.9
X2HCB	HEXACHLOROBENZENE	ug/L	2	0.03	0.07	10	2	20.0	276	11	4.0	0.01	0.01	1.96	1.39	18.9
P1CHLG	GAMMA-CHLORDANE	ug/L	1	0.02	0.02	10	1	10.0	276	9	3.3	0.01	0.01	1.25	1.49	16.2
P1DIEL	DIELDRIN	ug/L	3	0.03	0.03	10	1	10.0	276	8	2.9	0.01	0.01	1.42	1.28	18.9
P3SILV	SILVEX	ug/L	3	0.13	0.13	10	1	10.0	276	28	10.1	0.06	0.06	1.35	1.68	40.5

PLANT NAME : Toronto (Main)
PLANT TYPE : Secondary

SAMPLING TYPE : Raw Sewage
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	PLANT MIN. CONC. > MDL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
VOLATILES ORGANIC COMPOUNDS																
B2MPXY	M-, AND P-XYLENES	ug/L	1	58.00	170.00	10	6	60.0	274	43	15.7	52.09	26.00	2.39	2.02	37.8
B2EBNZ	ETHYLBENZENE	ug/L	1	43.00	190.00	10	4	40.0	274	30	11.0	34.66	23.50	2.24	1.75	29.7
B2OXYL	O-XYLENE	ug/L	1	48.00	100.00	10	2	20.0	274	25	9.1	25.64	22.47	1.74	1.56	24.3

PLANT NAME :Toronto (Main)
PLANT TYPE :Secondary

SAMPLING TYPE : Final Effluent
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	STD. FOR SURFACE WATER	STD. REF.	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET.	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																		
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0		-	7.50	85.00	10	10	100.0	213	211	99.1	23.08	21.23	2.13	2.07	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0		-	62.00	150.00	10	10	100.0	213	211	99.1	76.57	52.80	1.30	1.85	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0		-	12.40	297.00	10	10	100.0	220	220	100.0	19.88	8.09	2.61	1.60	100.0
NNHTPR	AMMONIUM,TOTAL PILT.REAC.	mg/L	0		-	22.00	27.70	10	10	100.0	223	204	91.5	26.01	3.90	1.06	6.98	100.0
NNTEUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0		-	25.90	32.10	10	10	100.0	222	222	100.0	29.97	7.97	1.09	2.71	100.0
PH	(-LOG(H+(CONC))		0		-	6.90	7.53	10	10	100.0	224	224	100.0	7.16	7.10	1.04	1.05	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0		-	5.80	19.60	10	10	100.0	220	219	99.6	11.03	10.12	1.44	2.00	100.0
RSPLOI	RESIDUE,PART.LOSS ON IGNI.	mg/L	0		-	8.10	11.10	5	5	100.0	77	58	75.3	9.38	7.47	1.16	2.71	93.3
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/L	0		-	0.20	0.67	6	5	83.3	211	206	97.6	0.27	0.68	1.56	1.97	100.0
NNO2PR	NITRITE,FILT. REACT.	mg/L	0		-	0.03	0.23	10	7	70.0	220	194	88.2	0.04	0.22	3.75	5.95	96.4
NNOTPR	NITRATES,TOTAL FILT.REAC.	mg/L	0		-	0.25	2.00	10	4	40.0	224	186	83.0	0.16	2.33	3.35	7.75	96.4
PHNOL	PHENOLICS (4AAP)	mg/L	0	0.00	ONT-MOE	0.12	0.15	10	2	20.0	225	33	14.7	0.07	0.07	1.83	1.86	53.6
METALS																		
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	3750.00	ONT-MOE	160.00	360.00	11	11	100.0	267	267	100.0	200.00	340.90	1.25	2.14	100.0
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	100.00	ONT-MOE	10.00	140.00	11	10	90.9	267	137	51.3	20.00	9.00	2.26	2.00	89.3
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	30.00	ONT-MOE	10.00	50.00	11	10	90.9	267	262	98.1	20.00	53.30	1.53	2.48	100.0
CCNPUR	CYANIDE-FREE,UNFILT.REAC.	ug/L	0	5.00	ONT-MOE	20.00	40.00	10	9	90.0	222	42	18.9	20.00	1.30	2.46	3.68	46.4
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	0.20	ONT-MOE	0.03	0.05	10	9	90.0	233	220	94.4	0.05	0.03	2.31	2.62	100.0
NIUT	NICKEL,UNFILT.TOTAL	ug/L	0	25.00	ONT-MOE	30.00	40.00	11	9	81.8	267	171	64.0	40.00	22.10	1.53	3.60	85.7
COUT	COBALT,UNFILT.TOTAL	ug/L	0	5.00	NYS-STD	10.00	10.00	11	7	63.6	266	65	24.4	10.00	6.40	1.52	1.54	82.1
MOUT	MOLYBDENUM,UNFILT.TOTAL	ug/L	0		-	10.00	10.00	11	7	63.6	267	75	28.1	10.00	6.60	1.67	1.56	67.9
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	75.00	ONT-MOE	80.00	180.00	8	5	62.5	264	196	74.2	130.00	101.70	1.67	3.72	96.4
CUUT	COPPER,UNFILT.TOTAL	ug/L	0	5.00	ONT-MOE	10.00	10.00	5	1	20.0	47	30	63.8	10.00	13.10	1.36	2.56	77.8
AGUT	SILVER,UNFILT.TOTAL	ug/L	0	0.10	ONT-MOE	10.00	10.00	11	1	9.1	267	15	5.6	10.00	6.90	1.68	1.84	32.1
PBUT	LEAD,UNFILT.TOTAL	ug/L	0	25.00	ONT-MOE	20.00	20.00	11	1	9.1	267	25	9.4	20.00	16.50	2.35	1.48	60.7
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																		
PMDMP	DIMETHYL PHTHALATE	ug/L	1	50.00	NYS-GUL	2.60	2.60	10	1	10.0	228	1	0.4	1.10	1.07	1.35	1.48	3.6
PMM4CRE	M-CRESOL	ug/L	1		-	30.50	30.50	10	1	10.0	227	7	3.1	2.03	1.70	2.59	1.70	14.3
PMOCRE	O-CRESOL	ug/L	2		-	7.50	7.50	10	1	10.0	227	1	0.4	1.76	1.60	1.66	1.49	3.6
PMPHEN	PHENOL	ug/L	2	1.00	ONT-MOE	17.30	17.30	10	1	10.0	227	4	1.8	1.92	1.65	2.17	1.59	10.7
PNNAPH	NAPHTHALENE	ug/L	1	10.00	NYS-STD	2.40	2.40	10	1	10.0	228	1	0.4	1.09	1.06	1.32	1.48	3.6
PESTICIDES,HERBICIDES,PCBS																		
X2124	1,2,4-TRICHLOROBENZENE	ug/L	3	0.50	ONT-MOE	0.04	0.15	10	10	100.0	227	36	15.9	0.09	0.01	1.62	2.44	32.1
P1BHCG	GAMMA-BHC(HEXCHLORCYCLOHEXANE)	ug/L	2	0.06	ONT-MOE	0.01	0.02	10	9	90.0	227	157	69.2	0.01	0.02	1.62	2.48	96.4
P324D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	4.00	ONT-MOE	0.02	0.13	10	6	60.0	227	177	78.0	0.03	0.08	2.87	4.71	100.0
P1HEPT	HEPTACHLOR	ug/L	3	0.00	ONT-MOE	0.02	0.02	10	1	10.0	227	2	0.9	0.01	0.01	1.55	1.16	7.1
P245T	2,4,5-TRICLORPHENOXYACETIC ACID	ug/L	3		-	0.06	0.06	10	1	10.0	227	25	11.0	0.03	0.03	1.32	2.27	42.9
P5SILV	SILVEX	ug/L	3		-	0.05	0.05	10	1	10.0	227	23	10.1	0.03	0.03	1.25	1.83	50.0
VOLATILES ORGANIC COMPOUNDS																		
B2MPXY	M-, AND P-XYLENES	ug/L	1	50.00	NYS-GUL	2.40	15.00	10	3	30.0	224	5	2.2	1.77	1.05	2.77	1.45	10.7
B2OXYL	O-XYLENE	ug/L	1	100.00	ONT-MOE	2.70	2.70	10	1	10.0	224	5	2.2	1.10	1.05	1.37	1.38	14.3

PLANT NAME : Toronto (Main)
PLANT TYPE : Secondary

SAMPLING TYPE : Raw Sludge
SAMPLE FORM : Dry Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS (DRY WEIGHT)	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
COD	CHEMICAL OXYGEN DEMAND	mg/kg	0	11566.95	620253.16	2	2	100.0	45	45	100.0	84702.06	892221.45	16.70	3.19	100.0
NH3TPR	AMMONIUM,TOTAL FIL.T.REAC.	mg/kg	0	1188.03	6803.80	2	2	100.0	48	47	97.9	2843.09	5911.32	3.44	4.59	100.0
NNOTPR	NITRATES,TOTAL FIL.T.REAC.	mg/kg	0	8.55	25.32	2	2	100.0	48	43	89.6	14.71	25.44	2.16	2.21	93.9
NNTKUR	NITROGEN-TOT-KJEL.,UNF.TOT	mg/kg	0	40084.39	47008.55	2	2	100.0	51	51	100.0	43408.63	36897.85	1.12	2.98	100.0
PH	(-LOG(H+(CONCN))	mg/kg	0	6.46	6.91	2	2	100.0	49	49	100.0	6.68	6.03	1.05	1.10	100.0
PPUT	PHOSPHORUS,UNFIL.T.TOTAL	mg/kg	0	25783.48	25783.48	1	1	100.0	42	42	100.0	25783.48	20347.70	0.00	4.43	100.0
RST	RESIDUE, TOTAL	mg/kg	0	35100.00	47400.00	2	2	100.0	51	51	100.0	40788.97	32783.51	1.24	1.81	100.0
RSTLOI	RESIDUE,TOT.LOSS ON IGNI.	mg/kg	0	22100.00	26900.00	2	2	100.0	51	51	100.0	24382.17	20803.05	1.15	1.77	100.0
PHNOL	PHENOLICS (4AAP)	mg/kg	0	125.36	125.36	2	1	50.0	50	41	82.0	36.36	82.34	5.76	3.54	85.3
METALS																
AGUT	SILVER,UNFIL.T.TOTAL	mg/kg	0	78.06	111.11	2	2	100.0	45	40	88.9	93.13	30.17	1.28	2.61	84.4
ALUT	ALUMINUM,UNFIL.T.TOTAL	mg/kg	0	4008.44	7122.51	2	2	100.0	51	51	100.0	5343.23	9835.74	1.50	2.51	100.0
ASUT	ARSENIC,UNFIL.T.TOTAL	mg/kg	0	6.55	12.03	2	2	100.0	51	50	98.0	8.88	6.13	1.54	2.01	97.1
CDUT	CADMIUM,UNFIL.T.TOTAL	mg/kg	0	20.68	48.43	2	2	100.0	43	40	93.0	31.64	9.74	1.83	4.35	90.0
COUT	COBALT,UNFIL.T.TOTAL	mg/kg	0	12.82	18.78	2	2	100.0	41	30	73.2	15.52	9.29	1.31	4.69	73.3
CRUT	CHROMIUM,UNFIL.T.TOTAL	mg/kg	0	548.52	911.68	2	2	100.0	51	50	98.0	707.16	301.43	1.43	3.68	97.1
HGUT	MERCURY,UNFIL.T.TOTAL	mg/kg	0	2.85	3.16	2	2	100.0	50	50	100.0	3.00	2.23	1.08	1.67	100.0
MOUT	MOLYBDENUM,UNFIL.T.TOTAL	mg/kg	0	2.32	2.32	1	1	100.0	37	23	62.2	2.32	5.80	0.00	2.88	64.3
NIUT	NICKEL,UNFIL.T.TOTAL	mg/kg	0	54.85	71.23	2	2	100.0	46	44	95.7	62.50	59.17	1.20	2.90	93.3
PBUT	LEAD,UNFIL.T.TOTAL	mg/kg	0	183.54	276.35	2	2	100.0	49	48	98.0	225.22	173.99	1.34	2.24	96.9
SEUT	SELENIUM,UNFIL.T.TOTAL	mg/kg	0	3.70	4.43	2	2	100.0	50	48	96.0	4.05	3.04	1.14	1.93	93.9
SRUT	STRONTIUM,UNFIL.T.TOTAL	mg/kg	0	88.61	153.85	2	2	100.0	51	51	100.0	116.76	231.70	1.48	1.97	100.0
ZNUT	ZINC,UNFIL.T.TOTAL	mg/kg	0	928.27	1652.42	2	2	100.0	51	51	100.0	1238.50	905.39	1.50	2.39	100.0
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PMMCRE	M-CRESOL	ug/kg	1	42194.10	304843.30	2	2	100.0	51	42	82.3	113413.40	116647.30	4.05	12.16	85.3
PNCHRY	CHRYSENE	ug/kg	1	6584.00	6584.00	2	1	50.0	51	2	3.9	3727.00	3026.90	2.24	1.93	5.9
DIOXINS AND FURANS																
P8CDD	OCTACHLORODIBENZODIOXIN	ug/kg	1	19.80	22.80	2	2	100.0	50	25	50.0	21.20	8.50	1.10	3.60	58.8
P7CDD	HEPTACHLORODIBENZODIOXIN	ug/kg	1	6.80	6.80	2	1	50.0	50	6	12.0	4.40	7.20	1.87	4.12	17.7
PESTICIDES,HERBICIDES,PCBS																
P1DIEL	DIELDRIN	ug/kg	2	10.50	14.20	2	2	100.0	51	20	39.2	12.20	7.20	1.24	3.10	50.0
P24D	2,4-DICHLOROPHENOXYACETIC ACID	ug/kg	3	65.50	90.70	2	2	100.0	51	38	74.5	77.10	93.20	1.28	6.50	82.3
P3SILV	SILVEX	ug/kg	3	39.90	274.30	2	2	100.0	51	23	45.1	104.60	47.30	3.91	3.40	55.9
X2124	1,2,4-TRICHLOROBENZENE	ug/kg	3	118.10	287.70	2	2	100.0	51	17	33.3	184.30	9.30	1.88	4.06	41.2
X2HCB	HEXACHLOROBENZENE	ug/kg	2	11.40	25.30	2	2	100.0	51	17	33.3	17.00	5.60	1.76	2.65	38.2
P1BHCA	ALPHA-BHC(HEXACHLORCYCLOHEXANE)	ug/kg	1	8.40	8.40	2	1	50.0	51	12	23.5	4.80	5.50	2.17	2.74	35.3
P1BHCB	BETA-BHC (HEXACHLORCYCLOHEXANE)	ug/kg	1	6.30	6.30	2	1	50.0	51	18	35.3	4.20	7.40	1.77	3.29	38.2
P1BHCG	GAMMA-BHC(HEXACHLORCYCLOHEXANE)	ug/kg	2	10.50	10.50	2	1	50.0	51	28	54.9	5.40	8.90	2.55	2.69	67.7
P1CHLA	ALPHA-CHLORDANE	ug/kg	1	8.40	8.40	2	1	50.0	51	18	35.3	4.80	5.90	2.17	2.38	47.1
P1CHLG	GAMMA-CHLORDANE	ug/kg	1	10.50	10.50	2	1	50.0	51	19	37.3	5.40	6.00	2.55	2.44	50.0

PLANT NAME : Toronto (Main)
PLANT TYPE : Secondary

SAMPLING TYPE : Raw Sludge
SAMPLE FORM : Dry Weight

CONTAM-INANT	CONTAMINANT NAME	UNITSQA/QC (DRY WEIGHT)	CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
P1PCBT	PCB, TOTAL	ug/kg	2	139.20	139.20	2	1	50.0	51	40	78.4	39.80	88.70	5.87	3.18	79.4
P1PPDE	PP-DDE	ug/kg	1	12.70	12.70	2	1	50.0	51	22	43.1	6.00	7.30	2.91	2.31	52.9
P5245T	2,4,5-TRICLORPHENOXYACETIC ACID	ug/kg	3	37.00	37.00	2	1	50.0	51	21	41.2	62.50	48.90	2.10	3.49	47.1
VOLATILE ORGANIC COMPOUNDS																
B2EBNZ	ETHYLBENZENE (C8H10)	ug/kg	1	738.40	2678.10	2	2	100.0	51	10	19.6	1406.20	890.70	2.49	2.60	26.5
B2MPXY	M-, AND P-XYLENES	ug/kg	1	11396.00	25316.50	2	2	100.0	51	16	31.4	16985.50	1345.90	1.76	3.86	41.2
B2OXYL	O-XYLENE (C8H10)	ug/kg	1	2849.00	2849.00	2	1	50.0	51	8	15.7	1096.40	841.60	3.86	2.51	23.5
X1CHLO	CHLOROFORM (CHCL3)	ug/kg	1	7122.50	7122.50	2	1	50.0	51	12	23.5	1733.50	1225.10	7.38	4.24	35.3
X1THTR	TETRACHLOROETHYLENE	ug/kg	1	1396.00	1396.00	2	1	50.0	51	3	5.9	767.40	661.30	2.33	1.90	8.8

PLANT NAME : Toronto (Main)
PLANT TYPE : Secondary

SAMPLING TYPE : Treated Sludge
SAMPLE FORM : Dry Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS (DRY WEIGHT)	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
COD	CHEMICAL OXYGEN DEMAND	mg/kg	0	699579.83	699579.83	1	1	100.0	36	36	100.0	699579.83	508097.94	0.00	4.65	100.0
NNTKUR	NITROGEN-TOT-KJEL,UNP.TOT	mg/kg	0	16100.00	20599.99	2	2	100.0	49	49	100.0	18211.53	38494.12	1.19	1.77	100.0
PH	(-LOG(H+(CONCN))	mg/kg	0	6.90	7.20	2	2	100.0	47	47	100.0	7.05	7.17	1.03	1.09	100.0
PHNOL	PHENOLICS (4AAP)	mg/kg	0	15.79	27.31	2	2	100.0	49	41	83.7	20.76	43.05	1.47	3.14	87.9
PPUT	PHOSPHORUS,UNFIL.T.TOTAL.	mg/kg	0	36210.01	43220.01	2	2	100.0	43	43	100.0	39560.04	76638.67	1.13	6.91	100.0
RST	RESIDUE, TOTAL.	mg/kg	0	238000.00	253400.00	2	2	100.0	50	50	100.0	245579.32	80434.04	1.05	3.23	100.0
RSTLOI	RESIDUE,TOT.LOSS ON IGNI.	mg/kg	0	99722.00	120061.00	2	2	100.0	50	50	100.0	109419.94	43979.33	1.14	3.19	100.0
METALS																
AGUT	SILVER,UNFIL.T.TOTAL.	mg/kg	0	134.45	240.73	2	2	100.0	44	44	100.0	179.91	37.78	1.51	2.33	100.0
ALUT	ALUMINUM,UNFIL.T.TOTAL.	mg/kg	0	10260.46	15966.39	2	2	100.0	50	50	100.0	12799.31	10715.94	1.37	2.82	100.0
ASUT	ARSENIC,UNFIL.T.TOTAL.	mg/kg	0	1.01	5.05	2	2	100.0	50	49	98.0	2.26	3.40	3.12	2.08	97.1
CDUT	CADMIUM,UNFIL.T.TOTAL.	mg/kg	0	46.22	47.36	2	2	100.0	45	41	91.1	46.78	10.47	1.02	3.98	90.3
COUT	COBALT,UNFIL.T.TOTAL.	mg/kg	0	15.97	28.41	2	2	100.0	39	32	82.1	21.30	9.14	1.50	2.75	85.7
CRUT	CHROMIUM,UNFIL.T.TOTAL.	mg/kg	0	1420.68	1537.82	2	2	100.0	50	50	100.0	1478.09	333.06	1.06	3.59	100.0
CUUT	COPPER,UNFIL.T.TOTAL.	mg/kg	0	1302.29	1713.87	2	2	100.0	45	45	100.0	1493.97	732.24	1.21	2.16	100.0
HGUT	MERCURY,UNFIL.T.TOTAL.	mg/kg	0	5.04	13.81	2	2	100.0	50	49	98.0	8.35	3.24	2.04	2.04	97.1
MOUT	MOLYBDENUM,UNFIL.T.TOTAL.	mg/kg	0	8.29	8.29	1	1	100.0	34	23	67.7	8.29	6.41	0.00	2.84	69.2
NIUT	NICKEL,UNFIL.T.TOTAL.	mg/kg	0	105.04	122.34	2	2	100.0	45	42	93.3	113.36	72.95	1.11	2.95	90.0
PBUT	LEAD,UNFIL.T.TOTAL.	mg/kg	0	434.10	453.78	2	2	100.0	50	49	98.0	443.83	199.62	1.03	2.46	97.1
SBUT	SELENIUM,UNFIL.T.TOTAL.	mg/kg	0	0.59	1.34	2	2	100.0	50	48	96.0	0.89	2.67	1.79	2.98	97.1
SRUT	STRONTIUM,UNFIL.T.TOTAL.	mg/kg	0	205.21	226.89	2	2	100.0	50	50	100.0	215.78	240.93	1.07	2.54	100.0
ZNUT	ZINC,UNFIL.T.TOTAL.	mg/kg	0	2367.80	2747.90	2	2	100.0	50	50	100.0	2550.78	988.90	1.11	2.57	100.0
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PNCHRY	CHRYSENE	ug/kg	1	971.00	971.00	2	1	50.0	50	4	8.0	619.00	1475.50	1.89	3.39	11.8
PNNAPH	NAPHTHALENE	ug/kg	1	2389.10	2389.10	2	1	50.0	50	6	12.0	970.90	1545.60	3.57	3.77	14.7
PNPHEN	PHENANTHRENE	ug/kg	1	2868.50	2868.50	2	1	50.0	50	12	24.0	1083.90	2220.50	4.07	4.27	26.5
DIOXINS AND FURANS																
P7CDD	HEPTACHLORODIBENZODIOXIN	ug/kg	1	12.60	23.50	2	2	100.0	49	10	20.4	17.20	5.00	1.55	3.21	23.5
P8CDD	OCTACHLORODIBENZODIOXIN	ug/kg	1	30.50	67.20	2	2	100.0	49	26	53.1	37.10	7.10	2.32	3.84	64.7
P5CDD	PENTACHLORODIBENZODIOXIN	ug/kg	2	1.30	1.30	2	1	50.0	49	1	2.0	0.50	3.20	3.76	6.14	2.9
P6CDD	HEXACHLORODIBENZODIOXIN	ug/kg	2	3.80	3.80	2	1	50.0	49	2	4.1	1.20	2.40	4.91	3.52	5.9
PESTICIDES,HERBICIDES,PCBS																
P1ALDR	ALDRIN	ug/kg	1	12.60	17.30	2	2	100.0	50	11	22.0	14.80	5.50	1.25	2.67	26.5
P1CHLA	ALPHA-CHLORDANE	ug/kg	1	11.10	29.00	2	2	100.0	50	22	44.0	17.90	6.50	1.97	2.41	55.9
P1CHLG	GAMMA-CHLORDANE	ug/kg	1	9.90	29.40	2	2	100.0	50	21	42.0	17.10	6.80	2.16	2.58	52.9
P1END1	ENDOSULFAN I	ug/kg	3	34.70	47.80	2	2	100.0	50	6	12.0	40.70	4.90	1.25	2.96	11.8
P1HEPE	HEPTACHLOREPOXIDE	ug/kg	2	11.10	14.60	2	2	100.0	50	10	20.0	12.70	5.20	1.21	2.86	23.5
P1MIRX	MIREX	ug/kg	1	17.90	23.60	2	2	100.0	50	8	16.0	20.60	4.90	1.22	2.52	17.7
P1PPDE	PP DDE	ug/kg	1	13.80	52.00	2	2	100.0	50	14	28.0	26.80	11.10	2.55	2.72	73.5
X2124	1,2,4-TRICHLOROBENZENE	ug/kg	3	523.30	784.70	2	2	100.0	50	22	44.0	505.70	14.80	1.87	5.02	52.9

PLANT NAME : Toronto (Main)
PLANT TYPE : Secondary

SAMPLING TYPE : Treated Sludge
SAMPLE FORM : Dry Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS (DRY WEIGHT)	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
X2HCB	HEXACHLOROBENZENE	ug/kg	2	8.50	123.70	2	2	100.0	50	21	42.0	32.40	7.00	6.64	2.96	55.9
P1BHCA	ALPHA-BHC(HEXACHLORCYCLOHEXANE)	ug/kg	1	11.80	11.80	2	1	50.0	50	11	22.0	7.00	5.60	2.08	3.00	32.4
P1BHCB	BETA-BHC (HEXCHLORCYCLOHEXANE)	ug/kg	1	13.50	13.50	2	1	50.0	50	19	38.0	7.50	8.80	2.28	4.39	47.1
P1BHCD	DELTA-BHC(HEXCHLORCYCLOHEXANE)	ug/kg	1	9.70	9.70	2	1	50.0	50	4	8.0	6.40	3.90	1.81	1.93	11.8
P1BHCG	GAMMA-BHC(HEXCHLORCYCLOHEXANE)	ug/kg	2	8.50	8.50	2	1	50.0	50	12	24.0	5.80	5.70	1.73	3.13	35.3
P1DIEL	DIELDRIN	ug/kg	2	42.70	42.70	2	1	50.0	50	15	30.0	13.40	6.50	5.15	3.51	38.2
P1DMOT	METHOXYCHLOR	ug/kg	1	123.40	123.40	2	1	50.0	50	15	30.0	50.90	34.10	3.50	4.42	38.2
P1HEPT	HEPTACHLOR	ug/kg	3	28.10	28.10	2	1	50.0	50	9	18.0	10.50	4.70	4.04	2.20	23.5
P1PCBT	PCB, TOTAL	ug/kg	2	304.70	304.70	2	1	50.0	50	32	64.0	113.10	114.10	4.06	4.58	67.7
	VOLATILE ORGANIC COMPOUNDS															
B2EBNZ	ETHYLBENZENE (C8H10)	ug/kg	1	434.10	1134.50	2	2	100.0	50	14	28.0	701.80	606.50	1.97	5.59	32.4
B2MPXY	M-, AND P-XYLENES	ug/kg	1	2352.90	10260.50	2	2	100.0	50	15	30.0	4913.40	816.00	2.83	7.11	32.4
B2OXYL	O-XYLENE (C8H10)	ug/kg	1	268.40	1512.60	2	2	100.0	50	14	28.0	637.20	523.50	3.40	4.05	32.4
X1CHLO	CHLOROFORM (CHCL3)	ug/kg	1	2226.90	2226.90	2	1	50.0	50	12	24.0	419.20	441.70	10.61	4.33	35.3

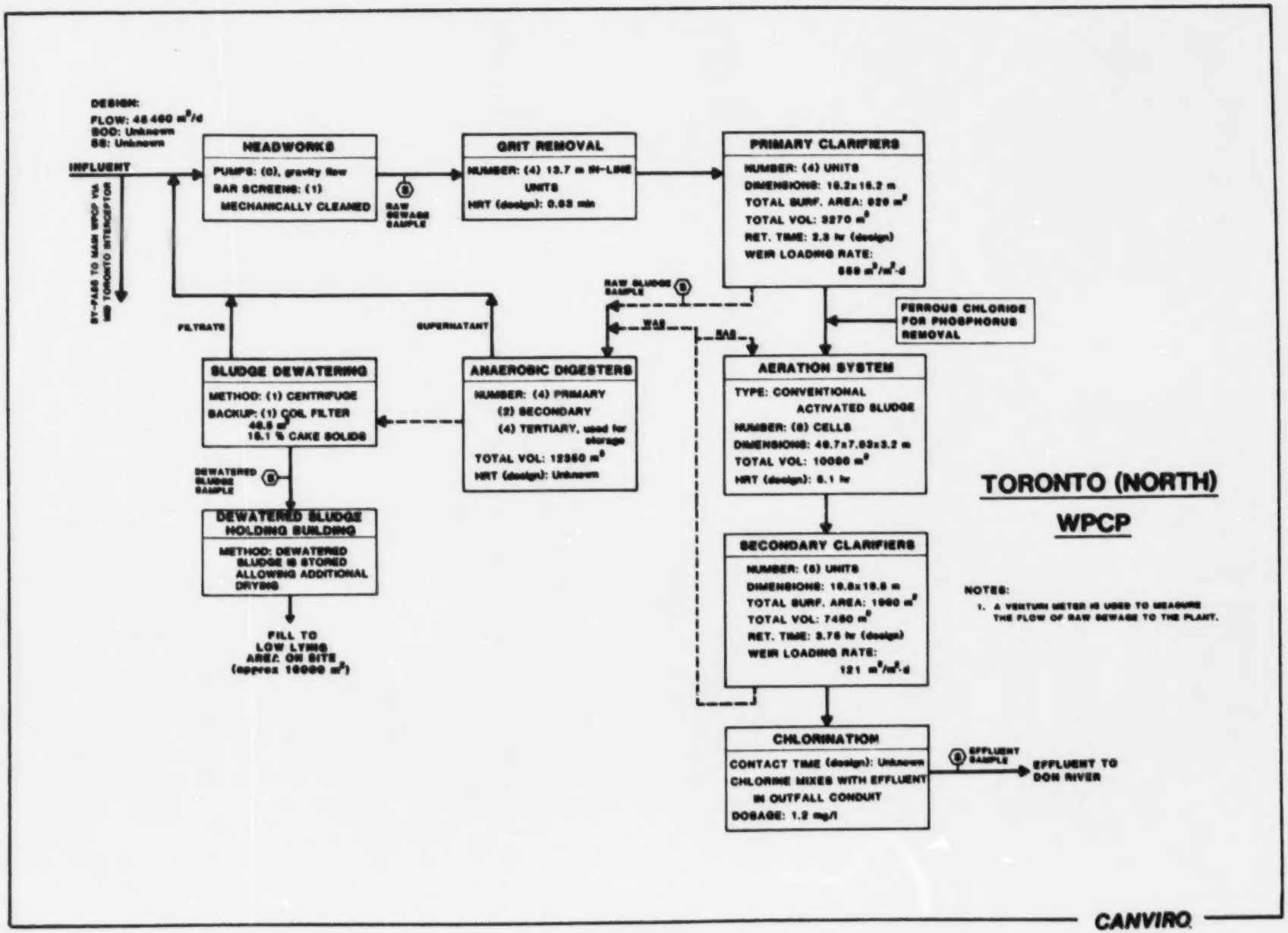
Sub-Appendix A-32

Toronto (North) WPCP

Contents:

- Plant Schematic with Design Characteristics
- Annual Data Review (1981 - 1986 Plant Performance)
- Sources of Municipal Water Pollution Control Plant Raw Sewage
- Operational Evaluation for Toronto (North) WPCP
- Analytical Data

(KIR18/28A)


DESIGN:
FLOW: 45 460 m³/d
BOD: Unknown
SS: Unknown
INFLUENT
BY-PASS TO MAIN WPCP VIA NORTH TORONTO INTERCEPTOR
HEADWORKS
PUMPS: (0), gravity flow
BAR SCREENS: (1)
MECHANICALLY CLEANED
RAW SEWAGE SAMPLE
GRIT REMOVAL
NUMBER: (4) 13.7 m IN-LINE UNITS
HRT (design): 0.03 min
PRIMARY CLARIFIERS
NUMBER: (4) UNITS
DIMENSIONS: 16.2x16.2 m
TOTAL SURF. AREA: 829 m²
TOTAL VOL: 3270 m³
RET. TIME: 2.3 hr (design)
WEIR LOADING RATE:
559 m³/m²·d
RAW SLUDGE SAMPLE
FERROUS CHLORIDE FOR PHOSPHORUS REMOVAL
FILTRATE
SUPERNATANT
WAS
RAS
SLUDGE DEWATERING
METHOD: (1) CENTRIFUGE
BACKUP: (1) COIL FILTER
46.8 m³
16.1 % CAKE SOLIDS
ANAEROBIC DIGESTERS
NUMBER: (4) PRIMARY
(2) SECONDARY
(4) TERTIARY, used for storage
TOTAL VOL: 12360 m³
HRT (design): Unknown
AERATION SYSTEM
TYPE: CONVENTIONAL ACTIVATED SLUDGE
NUMBER: (8) CELLS
DIMENSIONS: 48.7x7.62x3.2 m
TOTAL VOL: 10060 m³
HRT (design): 5.1 hr
DEWATERED SLUDGE SAMPLE
DEWATERED SLUDGE HOLDING BUILDING
METHOD: DEWATERED SLUDGE IS STORED ALLOWING ADDITIONAL DRYING
FILL TO LOW LYING AREA ON SITE (approx 10000 m²)
SECONDARY CLARIFIERS
NUMBER: (8) UNITS
DIMENSIONS: 18.8x18.8 m
TOTAL SURF. AREA: 1990 m²
TOTAL VOL: 7460 m³
RET. TIME: 3.76 hr (design)
WEIR LOADING RATE:
121 m³/m²·d
CHLORINATION
CONTACT TIME (design): Unknown
CHLORINE MIXES WITH EFFLUENT IN OUTFALL CONDUIT
DOSAGE: 1.2 mg/l
EFFLUENT SAMPLE
EFFLUENT TO DON RIVER
TORONTO (NORTH)
WPCP
NOTES:
1. A VENTURI METER IS USED TO MEASURE THE FLOW OF RAW SEWAGE TO THE PLANT.
CANVIRO

NORTH TORONTO WPCP (EAST YORK)
Conventional Activated Sludge
Phosphorus Removal - Continuous
Capacity - 45.460 10(3)m3/day

PARAMETER	1981	1982	1983	1984	1985	5 YEAR AVERAGE 81-85
Avg. Daily Flow (1000 m3/day)	36.37	36.20	35.37	35.78	34.71	35.68
BOD5 - Influent (mg/L)	110.00	111.00	103.00	112.50	120.42	111.54
BOD5 - Effluent (mg/L)	15.90	18.50	14.50	12.83	15.00	15.36
Annual BOD5 Significantly Different from Mean Annual Average BOD5?	I.D.	I.D.	I.D.	I.D.	I.D.	
TSS - Influent (mg/L)	177.50	172.20	148.00	154.50	154.17	161.29
TSS - Effluent (mg/L)	20.90	21.00	17.00	7.67	6.75	14.04
Annual TSS Significantly Different from Mean Annual Average TSS?	I.D.	I.D.	I.D.	I.D.	I.D.	
Total P - Influent (mg/L)	5.90	5.31	5.10	5.32	5.00	5.34
Total P - Effluent (mg/L)	1.00	1.00	1.01	0.85	0.85	0.96
Annual TP Significantly Different from Mean Annual Average TP?	I.D.	I.D.	I.D.	I.D.	I.D.	
TP in Compliance?	Y	N	N	Y	Y	Y

I.D. - Insufficient Data

R

SOURCES OF MUNICIPAL WATER POLLUTION CONTROL PLANT RAW SEWAGE

GENERAL DESCRIPTION OF WATER POLLUTION CONTROL PLANT (WPCP)

NAME OF WPCP	NORTH TORONTO WPCP
WORKS NUMBER	120000364
TREATMENT TYPE	CONVENTIONAL ACTIVATED SLUDGE PHOSPHORUS REMOVAL CONTINUOUS
DESIGN CAPACITY (1000 m3/d)	45.460
1986 AVERAGE DAY FLOW (1000 m3/d)	35.717
POPULATION SERVED	55000

% OF TOTAL FLOW ATTRIBUTED TO:

INDUSTRIAL SOURCES (%)	8
COMMERCIAL SOURCES (%) (Population x 0.0757)	12
RESIDENTIAL SOURCES (%) (Population x 0.175)	27
UNACCOUNTED FOR, INCL. INFILTRATION (100-% Contributed from industrial, commercial and residential sources)	53

PROFILE OF INDUSTRIES IN CATCHMENT

TOTAL NO OF INDUSTRIES	91
INDUSTRIES WITH WATER	83
NO OF SIC CATEGORIES	28

DESCRIPTION OF THE TOP 5 INDUSTRIES DISCHARGED TO THE WPCP (BASED ON WATER USE DATA)

DESCRIPTION	SIC	# OF COMPANIES
PRINTING AND PUBLISHING	2700-2799	42
INSTRUMENTS AND RELATED PRODUCTS	3811-3873	4
MACHINERY MFG	3500-3599	7
ELECTRICAL & ELECTRONIC COMPONENTS	3612-3690	5
STONE, CLAY AND MINERAL PRODUCTS	3200-3299	2

R

OPERATIONAL EVALUATION FOR: T O R O N T O N O R T H W P C P

TREATMENT FACILITY: Secondary
PERIOD ENDING: June 14,1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 45,460 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
RAW SEWAGE FLOW	36,000	37,200	36,300	35,800	36,400	36,100	32,100
% of Design Flow	79.19%	81.83%	79.85%	78.75%	80.07%	79.41%	70.61%
Influent BOD (mg/L)		270	240	140			
Primary BOD (mg/L)		230	180	120			
Secondary BOD (mg/L)		15	20	24			
% PRIMARY REMOVAL		14.8	25.0	14.3			
% SECONDARY REMOVAL		94.4	91.7	82.9			
Influent SS (mg/L)	180	180	150	140	130	90	90
Primary SS (mg/L)	100	100	130	55	100	75	75
Secondary SS (mg/L)	6	6	2	4	3	3	
% PRIMARY REMOVAL	44.4	44.4	13.3	60.7	23.1	16.7	16.7
% SECONDARY REMOVAL	96.7	96.7	98.7	97.1	97.7	96.7	100.0
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)	5.8	5.5	3.6	4.2	4.5	3.9	3.9
Primary Total P (mg/L)							
Secondary Total P (mg/L)	0.88	0.86	0.74	0.56	0.52	0.50	
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	84.8	84.4	79.4	86.7	88.4	87.2	

OPERATIONAL EVALUATION FOR: T O R O N T O N O R T H W P C P

TREATMENT FACILITY: Secondary
PERIOD ENDING: June 14,1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 45,460 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 8	DAY 9	DAY 10	DAY 11	DAY 12	DAY 13	DAY 14
RAW SEWAGE FLOW	34,100	37,700	37,500	36,300	34,400	36,100	36,600
% of Design Flow	75.01%	82.93%	82.49%	79.85%	75.67%	79.41%	80.51%
Influent BOD (mg/L)		200	130	130	160		
Primary BOD (mg/L)		210	130	110	110		
Secondary BOD (mg/L)		10	13	13	8		
% PRIMARY REMOVAL		-5.0	0.0	15.4	31.3		
% SECONDARY REMOVAL		95.0	90.0	90.0	95.0		
Influent SS (mg/L)	140	220	250	120	160	140	140
Primary SS (mg/L)	85	100	100	80	90	80	80
Secondary SS (mg/L)	8	5	6	7	2	6	6
% PRIMARY REMOVAL	39.3	54.5	60.0	33.3	43.8	42.9	42.9
% SECONDARY REMOVAL	94.3	97.7	97.6	94.2	98.8	95.7	95.7
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)	4.2	5.7	4.9	4.7	4.9	4.8	4.8
Primary Total P (mg/L)							
Secondary Total P (mg/L)	0.60	0.52	0.66	0.56	0.64	0.60	0.86
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	85.7	90.9	86.5	88.1	86.9	87.5	82.1

OPERATIONAL EVALUATION FOR: T O R O N T O N O R T H WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: June 14,1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 45,460 m3/d

PARAMETER	SAMPLING PERIOD DAY 15	DAY 16	DAY 17	DAY 18	DAY 19	DAY 20	DAY 21
RAW SEWAGE FLOW	36,500	37,400	36,300	34,400	35,600	35,600	35,400
% of Design Flow	80.29%	82.27%	79.85%	75.67%	78.31%	78.31%	77.87%
Influent BOD (mg/L)		120	130	150	140		
Primary BOD (mg/L)		120	160	160	130		
Secondary BOD (mg/L)		24	24	24	20		
% PRIMARY REMOVAL		0.0	-23.1	-6.7	7.1		
% SECONDARY REMOVAL		80.0	81.5	84.0	85.7		
Influent SS (mg/L)	110	120	130	85	140	100	160
Primary SS (mg/L)	80	80	90	65	55	70	70
Secondary SS (mg/L)	9	5	5	5	7	4	4
% PRIMARY REMOVAL	27.3	33.3	30.8	23.5	60.7	30.0	56.3
% SECONDARY REMOVAL	91.8	95.8	96.2	94.1	95.0	96.0	97.5
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)	5.0	3.8	4.6	4.3	5.5	4.7	4.7
Primary Total P (mg/L)							
Secondary Total P (mg/L)	0.84	0.90	0.90	0.98	0.96	1.02	0.80
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	83.2	76.3	80.4	77.2	82.5	78.3	83.0

PLANT NAME : Toronto (North)
PLANT TYPE : Secondary

SAMPLING TYPE : Raw Sewage
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	PLANT MIN. CONC. > MDL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0	71.90	137.00	5	5	100.0	267	266	99.6	96.75	140.23	1.32	1.93	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0	156.00	240.00	5	5	100.0	260	258	99.2	194.85	287.75	1.17	1.82	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0	14.50	19.00	5	5	100.0	271	271	100.0	16.93	22.39	1.11	1.81	100.0
NNHTPR	AMMONIUM,TOTAL FILT.REAC.	mg/L	0	16.90	27.30	5	5	100.0	275	274	99.6	20.85	15.37	1.20	1.69	100.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0	24.70	31.00	5	5	100.0	273	273	100.0	28.06	25.44	1.12	1.47	100.0
PH	(-LOG(H+(CONCN))		0	7.06	7.23	5	5	100.0	275	275	100.0	7.14	6.90	1.01	1.05	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0	57.00	69.70	5	5	100.0	267	266	99.6	65.42	126.88	1.09	1.93	100.0
RSPLOI	RESIDUE,PAR.LOSS ON IGNI.	mg/L	0	41.50	52.70	5	5	100.0	90	89	98.9	48.46	100.84	1.11	1.78	100.0
METALS																
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	360.00	780.00	6	6	100.0	322	306	95.0	580.00	1000.10	1.32	2.65	97.3
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	40.00	70.00	6	6	100.0	322	237	73.6	50.00	51.10	1.25	3.44	89.2
CUUT	COPPER,UNFILT.TOTAL	ug/L	0	120.00	120.00	1	1	100.0	49	48	98.0	120.00	110.60	0.00	2.28	97.1
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	0.18	0.60	5	5	100.0	283	274	96.8	0.31	0.23	1.54	2.11	100.0
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	180.00	230.00	6	6	100.0	319	318	99.7	220.00	370.70	1.10	2.14	100.0
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	50.00	120.00	6	6	100.0	322	315	97.8	90.00	211.00	1.40	2.94	100.0
MOUT	MOLYBDENUM,UNFILT.TOTAL	ug/L	0	30.00	30.00	6	1	16.7	321	41	12.8	10.00	12.40	1.57	1.72	56.8
NIUT	NICKEL,UNFILT.TOTAL	ug/L	0	20.00	20.00	6	1	16.7	322	103	32.0	10.00	38.80	1.33	2.70	54.1
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PM4CRE	M-CRESOL	ug/L	1	61.70	61.70	5	1	20.0	275	167	60.7	11.43	25.59	2.57	3.45	86.5
PESTICIDES,HERBICIDES,PCBS																
P1BHCG	GAMMA-BHC(HEXCHLORCYCLHEXANE)	ug/L	2	0.02	0.03	5	3	60.0	276	143	51.8	0.02	0.02	1.62	2.29	94.6
X2124	1,2,4-TRICHLOROBENZENE	ug/L	3	0.05	0.13	5	3	60.0	276	35	12.7	0.03	0.01	3.08	2.48	40.5
P524D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	0.05	0.09	5	2	40.0	276	214	77.5	0.03	0.13	2.00	3.72	100.0
P1BHCB	BETA-BHC (HEXCHLORCYCLHEXANE)	ug/L	1	0.03	0.03	5	1	20.0	276	32	11.6	0.01	0.01	1.63	1.66	35.1
VOLATILES ORGANIC COMPOUNDS																
B2BDCL	BROMODICHLOROBL.-ZENE	ug/L	1	55.00	55.00	5	1	20.0	274	2	0.7	24.48	20.55	1.57	1.12	5.4
B2EBNZ	ETHYLBENZENE	ug/L	1	110.00	110.00	5	1	20.0	274	30	11.0	28.13	23.50	2.14	1.75	29.7
B2STYR	STYRENE	ug/L	1	88.00	88.00	5	1	20.0	274	9	3.3	26.90	21.40	1.94	1.39	10.8
X23CTO	3-CHLOROTOLUENE	ug/L	1	44.00	44.00	5	1	20.0	274	1	0.4	23.42	20.51	1.42	1.11	2.7

PLANT NAME : Toronto (North)
PLANT TYPE : Secondary

SAMPLING TYPE : Final Effluent
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	STD. FOR SURFACE WATER	STD. REF.	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET.	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																		
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0		-	15.00	48.80	5	5	100.0	213	211	99.1	26.65	21.22	1.62	2.07	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0		-	30.00	70.00	5	5	100.0	213	211	99.1	43.05	52.80	1.41	1.83	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0		-	5.80	7.10	5	5	100.0	220	220	100.0	6.54	8.09	1.09	1.60	100.0
NH4TPR	AMMONIUM,TOTAL FILT.REAC.	mg/L	0		-	3.85	8.60	5	5	100.0	223	204	91.5	5.50	3.90	1.35	6.98	100.0
NNO2FR	NITRITE,FILT. REACT.	mg/L	0		-	0.70	1.24	5	5	100.0	220	194	88.2	0.96	0.22	1.25	5.95	98.4
NNO3FR	NITRATES,TOTAL FILT.REAC.	mg/L	0		-	9.10	11.90	5	5	100.0	224	186	83.0	10.97	2.33	1.12	7.75	98.4
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0		-	5.10	9.70	5	5	100.0	222	222	100.0	6.37	7.97	1.30	2.71	100.0
PH	(-LOG(H+(CONC))		0		-	6.89	7.27	5	5	100.0	224	224	100.0	7.06	7.10	1.02	1.05	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0		-	6.80	9.10	5	5	100.0	220	219	99.6	7.76	10.12	1.11	2.00	100.0
RSPLOI	RESIDUE,PAR.LOSS ON IGNI.	mg/L	0		-	5.40	6.70	5	4	80.0	77	58	75.3	4.99	7.47	1.30	2.71	93.5
METALS																		
CUUT	COPPER,UNFILT.TOTAL	ug/L	0	5.00	ONT-MOE	10.00	10.00	1	1	100.0	47	30	63.8	10.00	13.10	0.00	2.56	77.8
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	0.20	ONT-MOE	0.02	0.03	5	5	100.0	233	220	94.4	0.02	0.03	1.20	2.62	100.0
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	3750.00	ONT-MOE	170.00	190.00	6	6	100.0	267	267	100.0	180.00	340.90	1.05	2.14	100.0
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	30.00	ONT-MOE	30.00	40.00	6	6	100.0	267	262	98.1	30.00	33.30	1.12	2.48	100.0
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	75.00	ONT-MOE	50.00	70.00	6	4	66.7	266	196	74.2	50.00	101.70	1.66	3.72	98.4
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	100.00	ONT-MOE	10.00	10.00	6	2	33.3	267	137	51.3	10.00	9.00	1.43	2.00	89.3
NIUT	NICKEL,UNFILT.TOTAL	ug/L	0	25.00	ONT-MOE	10.00	20.00	6	2	33.3	267	171	64.0	10.00	22.10	1.79	3.60	85.7
MOUT	MOLYBDENUM,UNFILT.TOTAL	ug/L	0		-	10.00	10.00	6	1	16.7	267	75	28.1	10.00	6.60	1.33	1.56	67.9
PBUT	LEAD,UNFILT.TOTAL	ug/L	0	25.00	ONT-MOE	30.00	30.00	6	1	16.7	267	25	9.4	20.00	16.50	1.43	1.48	60.7
DIOXINS AND FURANS																		
P96CDD	OCTACHLORODIBENZODIOXIN	ng/L	1	150.00	ONT-MOE	0.10	0.10	1	1	100.0	44	4	9.1	0.10	0.31	0.00	3.43	14.3
PESTICIDES,HERBICIDES,PCBS																		
X2136	1,2,4-TRICHLOROBENZENE	ug/L	3	0.50	ONT-MOE	0.03	0.10	5	5	100.0	227	36	15.9	0.04	0.01	1.65	2.44	32.1
P1BHCG	GAMMA-BHC(HEXACHLORCYCLOHEXANE)	ug/L	2	0.04	ONT-MOE	0.02	0.05	5	4	80.0	227	157	69.2	0.02	0.02	1.99	2.48	98.4
P324D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	4.00	ONT-MOE	0.11	0.11	5	1	20.0	227	177	78.0	0.02	0.08	2.92	4.71	100.0
X1HCCP	HEXACHLOROCYCLOPENTADIENE	ug/L	3	0.07	NYS-STD	0.26	0.26	5	1	20.0	227	1	0.4	0.07	0.05	2.09	1.30	3.6

PLANT NAME : Toronto (North) **SAMPLING TYPE : Raw Sludge**
PLANT TYPE : Secondary **SAMPLE FORM : Dry Weight**

CONTAM-INANT	CONTAMINANT NAME	UNITS (DRY WEIGHT)	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
COD	CHEMICAL OXYGEN DEMAND	mg/kg	0	942771.08	942771.08	1	1	100.0	45	45	100.0	942771.08	892221.45	0.00	3.19	100.0
NNHTPR	AMMONIUM,TOTAL FILT.FRAC.	mg/kg	0	7951.81	7951.81	1	1	100.0	48	47	97.9	7951.81	5911.32	0.00	4.59	100.0
NNOTPR	NITRATES,TOTAL FILT.FRAC.	mg/kg	0	40.66	40.66	1	1	100.0	48	43	89.6	40.66	25.44	0.00	2.21	93.9
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/kg	0	46686.75	46686.75	1	1	100.0	51	51	100.0	46686.75	36897.85	0.00	2.98	100.0
PH	(-LOG(H+(CONC?))	mg/kg	0	5.61	5.61	1	1	100.0	49	49	100.0	5.61	6.03	0.00	1.10	100.0
PHENOL	PHENOLICS (4AAP)	mg/kg	0	39.16	39.16	1	1	100.0	50	41	82.0	39.16	82.34	0.00	3.54	85.3
RST	RESIDUE, TOTAL	mg/kg	0	33200.00	33200.00	1	1	100.0	51	51	100.0	33200.00	32783.51	0.00	1.81	100.0
RSTLOI	RESIDUE,TOT.LOSS ON IGNI	mg/kg	0	21300.00	21300.00	1	1	100.0	51	51	100.0	21300.00	20803.05	0.00	1.77	100.0
METALS																
AGUT	SILVER,UNFILT.TOTAL	mg/kg	0	45.18	45.18	1	1	100.0	45	40	88.9	45.18	30.17	0.00	2.61	84.4
ALUT	ALUMINUM,UNFILT.TOTAL	mg/kg	0	6026.10	6026.10	1	1	100.0	51	51	100.0	6026.10	9835.74	0.00	2.51	100.0
ASUT	ARSENIC,UNFILT.TOTAL	mg/kg	0	3.01	3.01	1	1	100.0	51	50	98.0	3.01	6.13	0.00	2.01	97.1
CDUT	CADMIUM,UNFILT.TOTAL	mg/kg	0	1.96	1.96	1	1	100.0	43	40	93.0	1.96	9.74	0.00	4.35	90.0
COUT	COBALT,UNFILT.TOTAL	mg/kg	0	14.76	14.76	1	1	100.0	41	30	73.2	14.76	9.29	0.00	4.69	73.3
CRUT	CHROMIUM,UNFILT.TOTAL	mg/kg	0	298.19	298.19	1	1	100.0	51	50	98.0	298.19	301.43	0.00	3.68	97.1
CUUT	COPPER,UNFILT.TOTAL	mg/kg	0	692.77	692.77	1	1	100.0	46	46	100.0	692.77	606.31	0.00	1.72	100.0
HGUT	MERCURY,UNFILT.TOTAL	mg/kg	0	3.31	3.31	1	1	100.0	50	50	100.0	3.31	2.23	0.00	1.67	100.0
NIUT	NICKEL,UNFILT.TOTAL	mg/kg	0	54.22	54.22	1	1	100.0	46	44	95.7	54.22	59.17	0.00	2.90	93.3
PBUT	LEAD,UNFILT.TOTAL	mg/kg	0	165.66	165.66	1	1	100.0	49	48	98.0	165.66	173.99	0.00	2.26	96.9
SEUT	SELENIUM,UNFILT.TOTAL	mg/kg	0	1.81	1.81	1	1	100.0	50	48	96.0	1.81	3.04	0.00	1.93	93.9
SRUT	STRONTIUM,UNFILT.TOTAL	mg/kg	0	123.49	123.49	1	1	100.0	51	51	100.0	123.49	231.70	0.00	1.97	100.0
ZNUT	ZINC,UNFILT.TOTAL	mg/kg	0	481.93	481.93	1	1	100.0	51	51	100.0	481.93	905.39	0.00	2.39	100.0
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PMMCRE	M-CRESOL	ug/kg	1	819277.10	819277.10	1	1	100.0	51	42	82.3	819277.10	116847.30	0.00	12.16	85.3
PMPHEN	PHENOL	ug/kg	2	26325.30	26325.30	1	1	100.0	51	15	29.4	26325.30	7312.80	0.00	3.00	38.2
DIOXINS AND FURANS																
P8CDD	OCTACHLORODIBENZODIOXIN	ug/kg	1	4.50	4.50	1	1	100.0	50	25	50.0	4.50	8.50	0.00	3.60	58.8
PESTICIDES,HERBICIDES,PCBS																
P1BHCG	GAMMA-BHC(HEXACHLORCYCLOHEXANE)	ug/kg	2	9.00	9.00	1	1	100.0	51	28	54.9	9.00	8.90	0.00	2.69	67.7
P1CHLA	ALPHA-CHLORDANE	ug/kg	1	9.00	9.00	1	1	100.0	51	18	35.3	9.00	5.90	0.00	2.38	47.1
P1DIEL	DIELDRIN	ug/kg	2	9.00	9.00	1	1	100.0	51	20	39.2	9.00	7.20	0.00	3.10	50.0
P1END1	ENDOSULFAN I	ug/kg	3	9.00	9.00	1	1	100.0	51	9	17.7	9.00	4.60	0.00	2.56	20.6
P1ENDR	ENDRIN	ug/kg	3	6.00	6.00	1	1	100.0	51	8	15.7	6.00	4.20	0.00	2.21	23.5
P1PCRT	PCB, TOTAL	ug/kg	2	45.20	45.20	1	1	100.0	51	40	78.4	45.20	88.70	0.00	3.18	79.4
P5SILV	SILVEX	ug/kg	3	51.20	51.20	1	1	100.0	51	23	45.1	51.20	47.30	0.00	3.40	55.9
X2124	1,2,4-TRICHLOROBENZENE	ug/kg	3	57.20	57.20	1	1	100.0	51	17	33.3	57.20	9.30	0.00	4.06	41.2

PLANT NAME : Toronto (North)
PLANT TYPE : Secondary

SAMPLING TYPE : Treated Sludge
SAMPLE FORM : Dry Weight

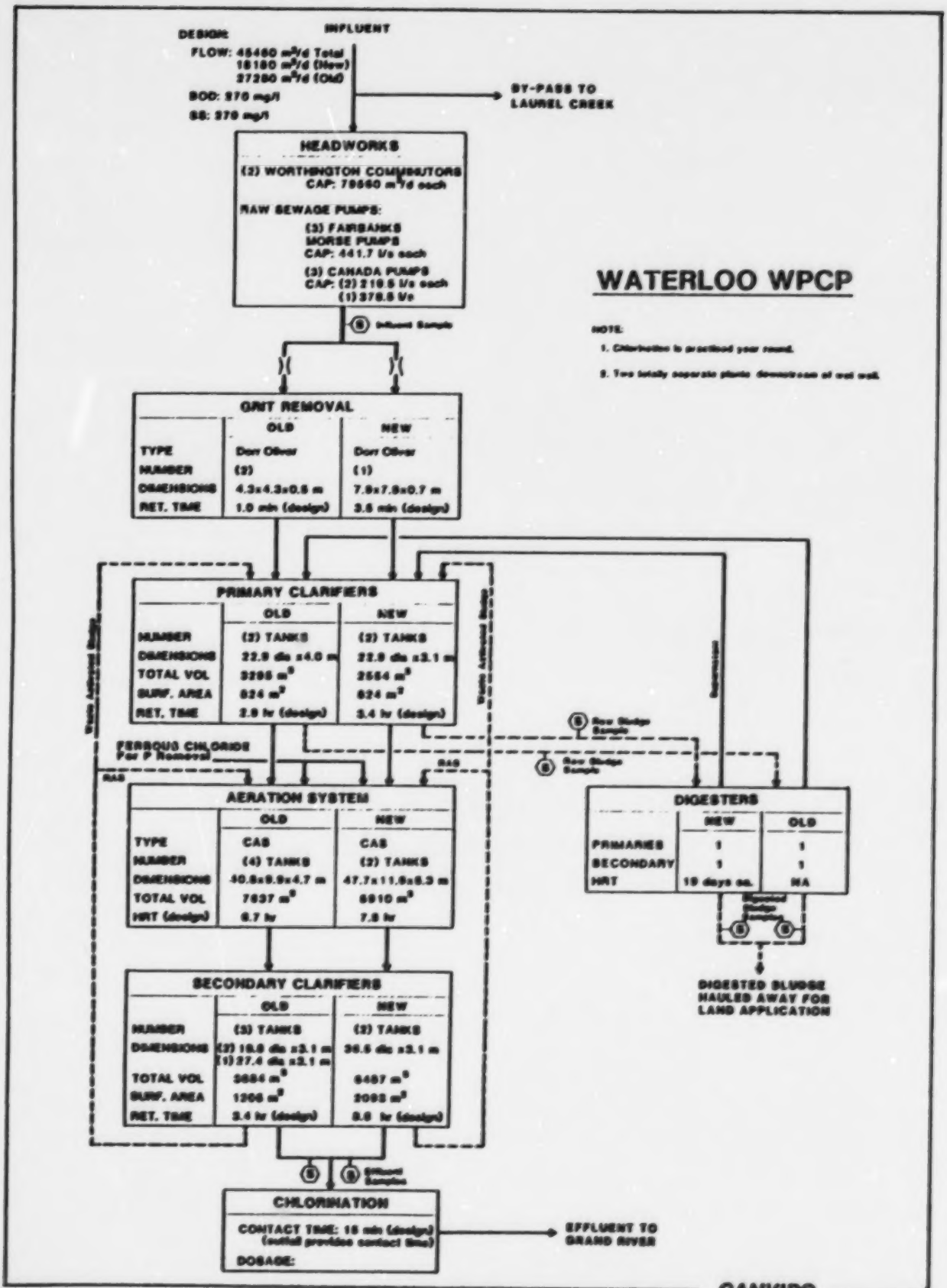
CONTAM-INANT	CONTAMINANT NAME	UNITS (DRY WEIGHT)	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
NNTKUR	NITROGEN-TOT-KJEL.,UNF.TOT	mg/kg	0	23399.99	23399.99	1	1	100.0	49	49	100.0	23399.99	38494.12	0.00	1.77	100.0
PH	(-LOG(H+(CONCN))	mg/kg	0	7.40	7.40	1	1	100.0	47	47	100.0	7.40	7.17	0.00	1.09	100.0
PHNOL	PHENOLICS (4AAP)	mg/kg	0	19.82	19.82	1	1	100.0	49	41	83.7	19.82	43.05	0.00	3.14	87.9
PPUT	PHOSPHORUS,UNFIL.T.TOTAL.	mg/kg	0	40930.00	40930.00	1	1	100.0	43	43	100.0	40930.00	76638.67	0.00	6.91	100.0
RST	RESIDUE, TOTAL	mg/kg	0	237100.00	237100.00	1	1	100.0	50	50	100.0	237100.00	80434.04	0.00	3.23	100.0
RSTLOI	RESIDUE,TOT.LOSS ON IGNI.	mg/kg	0	119878.00	119878.00	1	1	100.0	50	50	100.0	119878.00	43379.33	0.00	3.19	100.0
METALS																
AGUT	SILVER,UNFIL.T.TOTAL.	mg/kg	0	88.57	88.57	1	1	100.0	44	44	100.0	88.57	37.78	0.00	2.33	100.0
ALUT	ALUMINUM,UNFIL.T.TOTAL.	mg/kg	0	7591.73	7591.73	1	1	100.0	50	50	100.0	7591.73	10715.94	0.00	2.82	100.0
ASUT	ARSENIC,UNFIL.T.TOTAL.	mg/kg	0	4.77	4.77	1	1	100.0	50	49	98.0	4.77	5.40	0.00	2.06	97.1
CDUT	CADMIUM,UNFIL.T.TOTAL.	mg/kg	0	8.86	8.86	1	1	100.0	45	41	91.1	8.86	10.47	0.00	3.98	90.3
COUT	COBALT,UNFIL.T.TOTAL.	mg/kg	0	20.67	20.67	1	1	100.0	39	32	82.1	20.67	9.14	0.00	2.75	85.7
CRUT	CHROMIUM,UNFIL.T.TOTAL.	mg/kg	0	463.94	463.94	1	1	100.0	50	50	100.0	463.94	333.06	0.00	3.59	100.0
CUUT	COPPER,UNFIL.T.TOTAL.	mg/kg	0	1265.29	1265.29	1	1	100.0	45	45	100.0	1265.29	732.24	0.00	2.16	100.0
HGUT	MERCURY,UNFIL.T.TOTAL.	mg/kg	0	33.74	33.74	1	1	100.0	50	49	98.0	33.74	3.24	0.00	2.04	97.1
MOUT	MOLYBDENUM,UNFIL.T.TOTAL.	mg/kg	0	5.90	5.90	1	1	100.0	34	23	67.7	5.90	6.41	0.00	2.84	69.2
NIUT	NICKEL,UNFIL.T.TOTAL.	mg/kg	0	92.79	92.79	1	1	100.0	45	42	93.3	92.79	72.95	0.00	2.95	90.0
PBUT	LEAD,UNFIL.T.TOTAL.	mg/kg	0	506.12	506.12	1	1	100.0	50	49	98.0	506.12	196.62	0.00	2.46	97.1
SEUT	SELENIUM,UNFIL.T.TOTAL.	mg/kg	0	5.06	5.06	1	1	100.0	50	48	96.0	5.06	2.67	0.00	2.98	97.1
SRUT	STRONTIUM,UNFIL.T.TOTAL.	mg/kg	0	189.79	189.79	1	1	100.0	50	50	100.0	189.79	240.93	0.00	2.54	100.0
ZNUT	ZINC,UNFIL.T.TOTAL.	mg/kg	0	1012.23	1012.23	1	1	100.0	50	50	100.0	1012.23	988.90	0.00	2.57	100.0
PESTICIDES,HERBICIDES,PCBS																
P1ALDR	ALDRIN	ug/kg	1	9.60	9.60	1	1	100.0	50	11	22.0	9.60	5.30	0.00	2.67	36.5
P1CHLA	ALPHA-CHLORDANE	ug/kg	1	15.00	15.00	1	1	100.0	50	22	44.0	15.00	6.50	0.00	2.41	55.9
P1CHLG	GAMMA-CHLORDANE	ug/kg	1	10.10	10.10	1	1	100.0	50	21	42.0	10.10	6.80	0.00	2.58	52.9
P1PCBT	PCB, TOTAL	ug/kg	2	243.70	243.70	1	1	100.0	50	32	64.0	243.70	114.10	0.00	4.58	67.7
P1PPDE	PP-DDE	ug/kg	1	58.20	58.20	1	1	100.0	50	34	68.0	58.20	11.10	0.00	2.72	73.5
X2124	1,2,4-TRICHLOROBENZENE	ug/kg	3	207.80	207.80	1	1	100.0	50	22	44.0	207.80	14.80	0.00	5.02	52.9
X2HCB	HEXACHLOROBENZENE	ug/kg	2	91.10	91.10	1	1	100.0	50	21	42.0	91.10	7.00	0.00	2.96	55.9

Sub-Appendix A-33

Waterloo WPCP

Contents:

- Plant Schematic with Design Characteristics
- Annual Data Review (1981 - 1986 Plant Performance)
- Sources of Municipal Water Pollution Control Plant Raw Sewage
- Operational Evaluation for Waterloo WPCP
- Analytical Data


DESIGN:
INFLUENT
FLOW: 45460 m³/d Total
18180 m³/d (New)
27280 m³/d (Old)
BOD: 270 mg/l
SS: 270 mg/l
BY-PASS TO
LAUREL CREEK
HEADWORKS
(2) WORTHINGTON COMMINUTORS
CAP: 79560 m³/d each
RAW SEWAGE PUMPS:
(3) FAIRBANKS
MORSE PUMPS
CAP: 441.7 l/s each
(3) CANADA PUMPS
CAP: (2) 219.5 l/s each
(1) 378.8 l/s
Influent Sample
WATERLOO WPCP
NOTE:
1. Chlorination is practiced year round.
2. Two totally separate plants downstream of rail wall.
GRIT REMOVAL
OLD
NEW
TYPE
Dorr Oliver
Dorr Oliver
NUMBER
(2)
(1)
DIMENSIONS
4.3x4.3x0.8 m
7.9x7.9x0.7 m
RET. TIME
1.0 min (design)
3.6 min (design)
PRIMARY CLARIFIERS
OLD
NEW
NUMBER
(2) TANKS
(2) TANKS
DIMENSIONS
22.9 dia x4.0 m
22.9 dia x3.1 m
TOTAL VOL
3295 m³
2564 m³
SURF. AREA
824 m²
824 m²
RET. TIME
2.9 hr (design)
2.4 hr (design)
Waste Activated Sludge
Supernatant
Raw Sludge Sample
Raw Sludge Sample
FERROUS CHLORIDE
For P Removal
RAS
RAS
AERATION SYSTEM
OLD
NEW
TYPE
CAS
CAS
NUMBER
(4) TANKS
(2) TANKS
DIMENSIONS
40.8x9.9x4.7 m
47.7x11.9x5.3 m
TOTAL VOL
7837 m³
6910 m³
HRT (design)
6.7 hr
7.8 hr
DIGESTERS
NEW
OLD
PRIMARIES
1
1
SECONDARY
1
1
HRT
19 days ea.
NA
Digested Sludge Sample
Digested Sludge Sample
DIGESTED SLUDGE
HAULED AWAY FOR
LAND APPLICATION
SECONDARY CLARIFIERS
OLD
NEW
NUMBER
(3) TANKS
(2) TANKS
DIMENSIONS
(2) 18.0 dia x3.1 m
(1) 27.4 dia x3.1 m
36.5 dia x3.1 m
TOTAL VOL
3684 m³
6487 m³
SURF. AREA
1206 m²
2093 m²
RET. TIME
3.4 hr (design)
8.8 hr (design)
Effluent Sample
Effluent Sample
CHLORINATION
CONTACT TIME: 15 min (design)
(outfall provides contact time)
DOSAGE:
EFFLUENT TO
GRAND RIVER
CANVIRO

WATERLOO WPCP
Conventional Activated Sludge
Phosphorus Removal - Continuous
Capacity - 45.46 10(3)m3/day

PARAMETER	1981	1982	1983	1984	1985	MEAN ANNUAL AVERAGE
Avg. Daily Flow (1000 m3/day)	34.93	35.83	39.68	41.60	45.23	39.29
BOD5 - Influent (mg/L)	211.50	389.17	273.33	260.00	210.17	270.43
BOD5 - Effluent (mg/L)	9.32	11.00	14.17	12.75	6.83	10.81
Annual BOD5 Significantly Different from Mean Annual Average BOD5?	N	N	N	N	Y	
TSS - Influent (mg/L)	230.00	705.83	405.00	433.33	402.00	467.27
TSS - Effluent (mg/L)	7.46	10.92	9.02	10.42	8.92	9.35
Annual TSS Significantly Different from Mean Annual Average TSS?	N	N	N	N	N	
Total P - Influent (mg/L)	6.51	9.52	8.23	6.56	6.46	7.46
Total P - Effluent (mg/L)	0.73	0.79	0.78	0.90	0.75	0.81
Annual TP Significantly Different from Mean Annual Average TP?	N	N	N	Y	N	
TP in Compliance?	Y	Y	Y	Y	Y	Y

I.D. - Insufficient Data

R

SOURCES OF MUNICIPAL WATER POLLUTION CONTROL PLANT RAW SEWAGE

GENERAL DESCRIPTION OF WATER POLLUTION CONTROL PLANT (WPCP)

NAME OF WPCP	WATERLOO WPCP
WORKS NUMBER	110000793
TREATMENT TYPE	CONVENTIONAL ACTIVATED SLUDGE PHOSPHORUS REMOVAL CONTINUOUS
DESIGN CAPACITY (1000 m3/d)	45.460
1986 AVERAGE DAY FLOW (1000 m3/d)	45.932
POPULATION SERVED	66627

% OF TOTAL FLOW ATTRIBUTED TO:

INDUSTRIAL SOURCES (%)	13
COMMERCIAL SOURCES (%) (Population x 0.0757)	11
RESIDENTIAL SOURCES (%) (Population x 0.175)	25
UNACCOUNTED FOR, INCL. INFILTRATION (100-% Contributed from industrial, commercial and residential sources)	51

PROFILE OF INDUSTRIES IN CATCHMENT

TOTAL NO OF INDUSTRIES	170
INDUSTRIES WITH WATER	118
NO OF SIC CATEGORIES	32

DESCRIPTION OF THE TOP 5 INDUSTRIES DISCHARGED TO THE WPCP (BASED ON WATER USE DATA)

DESCRIPTION	SIC	# OF COMPANIES
BEVERAGES	2082-2087	3
TEXTILE PRODUCTS	2271-2299	4
PLASTICS MOLDING	3070-3079	12
ELECTRICAL AND ELECTRONICS COMPTS	3612-3690	16
PLASTICS,RESINS,SYNTHETIC FABRICS	2821-2824	2

R

OPERATIONAL EVALUATION FOR: WATERLOO WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: January 23, 1987
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: 45,460 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
RAW SEWAGE FLOW	42,050	43,650	40,200	39,650	38,700	32,850	35,650
% of Design Flow	92.50%	96.02%	88.43%	87.22%	85.13%	72.26%	78.42%
Influent BOD (mg/L)	190.0		200.0				
Primary BOD (mg/L)	82.0		128.0				
Secondary BOD (mg/L)	7.0		7.0				
% PRIMARY REMOVAL	56.8		36.0				
% SECONDARY REMOVAL	96.3		96.5				
Influent SS (mg/L)	420.0	310.0	340.0	340.0	460.0		
Primary SS (mg/L)	74.0	66.0	79.0	84.0	76.0		
Secondary SS (mg/L)	16.0	8.0	5.0	6.0	5.0		
% PRIMARY REMOVAL	82.4	78.7	76.8	75.3	83.5		
% SECONDARY REMOVAL	96.2	97.4	98.5	98.2	98.9		
Influent NH4 (mg/L)	13.8						
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)	5.5	6.5	5.0				
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	60.1						
Influent TKN (mg/L)	26.0						
Primary TKN (mg/L)							
Secondary TKN (mg/L)	22.6						
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	13.1						
Influent Total P (mg/L)	6.50			5.40			
Primary Total P (mg/L)							
Secondary Total P (mg/L)	1.50	1.20	1.00	0.80	0.40		
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	76.9			85.2			

OPERATIONAL EVALUATION FOR: WATERLOO WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: January 23, 1987
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: 45,460 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 8	DAY 9	DAY 10	DAY 11	DAY 12	DAY 13	DAY 14
RAW SEWAGE FLOW	47,350	52,300	39,900	37,300	39,200		
% of Design Flow	104.16%	115.05%	87.77%	82.05%	86.23%		
Influent BOD (mg/L)	160.0		220.0				
Primary BOD (mg/L)	81.0		103.0				
Secondary BOD (mg/L)	6.0		9.0				
% PRIMARY REMOVAL	49.4		53.2				
% SECONDARY REMOVAL	96.3		95.9				
Influent SS (mg/L)	240.0		350.0	390.0	450.0		
Primary SS (mg/L)	67.0		72.0	95.0	72.0		
Secondary SS (mg/L)	22.0		16.0	15.0	10.0		
% PRIMARY REMOVAL	72.1		79.4	75.6	84.0		
% SECONDARY REMOVAL	90.8		95.4	96.2	97.8		
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)	5.6		5.2				
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)	4.80			5.60			
Primary Total P (mg/L)							
Secondary Total P (mg/L)	1.00	0.80	0.70	0.40			
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	79.2			92.9			

OPERATIONAL EVALUATION FOR: WATERLOO WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: January 23, 1987
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: 45,460 m3/d

PARAMETER	SAMPLING PERIOD						
	DAY 15	DAY 16	DAY 17	DAY 18	DAY 19	DAY 20	DAY 21
RAW SEWAGE FLOW	39,500	40,600	40,950	42,300	42,860	37,150	38,550
% of Design Flow	86.89%	89.31%	90.08%	93.05%	94.28%	81.72%	84.80%
Influent BOD (mg/L)	230.0		200.0				
Primary BOD (mg/L)	52.0		122.0				
Secondary BOD (mg/L)	5.0		8.0				
% PRIMARY REMOVAL	77.4		39.0				
% SECONDARY REMOVAL	97.8		96.0				
Influent SS (mg/L)	490.0	540.0	440.0	440.0	850.0		
Primary SS (mg/L)	70.0	75.0	89.0	70.0	70.0		
Secondary SS (mg/L)	9.0	5.0	8.0	4.0	6.0		
% PRIMARY REMOVAL	85.7	86.1	79.8	84.1	91.8		
% SECONDARY REMOVAL	98.2	99.1	98.2	99.1	99.3		
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)	5.6	4.8	4.8				
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)	5.70			5.30			
Primary Total P (mg/L)							
Secondary Total P (mg/L)	1.00	0.60	0.60	0.40	0.50		
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	82.5			92.5			

OPERATIONAL EVALUATION FOR: WATERLOO WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: July 24, 1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 45,460 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
RAW SEWAGE FLOW	49,450	62,100	58,270	49,400	50,150	40,450	38,100
% of Design Flow	108.78%	136.60%	128.18%	108.67%	110.32%	88.98%	83.81%
Influent BOD (mg/L)	210.0		180.0				
Primary BOD (mg/L)	76.0		92.0				
Secondary BOD (mg/L)	11.0		17.0				
% PRIMARY REMOVAL	63.8		48.9				
% SECONDARY REMOVAL	94.8		90.6				
Influent SS (mg/L)	290.0	350.0	370.0	250.0	340.0		
Primary SS (mg/L)	74.0	75.0	102.0	75.0	77.0		
Secondary SS (mg/L)	13.0	18.0	9.0	6.0	4.0		
% PRIMARY REMOVAL	74.5	78.6	72.4	70.0	77.4		
% SECONDARY REMOVAL	95.5	94.9	97.6	97.6	98.8		
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)	7.80	8.10	7.90	7.80	7.90		
Primary Total P (mg/L)							
Secondary Total P (mg/L)	1.10	0.70	0.60	0.40	0.40		
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	85.9	91.4	92.4	94.9	94.9		

OPERATIONAL EVALUATION FOR: WATERLOO WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: July 24, 1997
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 45,460 m3/d

PARAMETER	PRE-SAMPLING PERIOD DAY 8	DAY 9	DAY 10	DAY 11	DAY 12	DAY 13	DAY 14
RAW SEWAGE FLOW	50,250	48,050	44,850	44,250	38,900	40,600	43,300
% of Design Flow	110.54%	105.70%	98.66%	97.34%	85.57%	89.31%	95.25%
Influent BOD (mg/L)	120.0		160.0				
Primary BOD (mg/L)	58.0		67.0				
Secondary BOD (mg/L)	25.0		3.0				
% PRIMARY REMOVAL	51.7		58.1				
% SECONDARY REMOVAL	79.2		98.1				
Influent SS (mg/L)	230.0	360.0	280.0	440.0	460.0		
Primary SS (mg/L)	58.0	75.0	70.0	81.0	91.0		
Secondary SS (mg/L)	25.0	8.0	6.0	5.0	4.0		
% PRIMARY REMOVAL	74.8	79.2	75.0	81.6	80.2		
% SECONDARY REMOVAL	89.1	97.8	97.9	98.9	99.1		
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)	8.00	7.80	7.80	7.80	7.90		
Primary Total P (mg/L)							
Secondary Total P (mg/L)	0.90	0.40	0.50	0.50	0.50		
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	88.8	94.9	93.6	93.6	93.7		

OPERATIONAL EVALUATION FOR: WATERLOO WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: July 24, 1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 45,460 m3/d

PARAMETER	SAMPLING PERIOD DAY 15	DAY 16	DAY 17	DAY 18	DAY 19	DAY 20	DAY 21
RAW SEWAGE FLOW	45,900	43,000	43,650	42,050	59,150		
% of Design Flow	100.97%	94.59%	96.02%	92.50%	130.11%		
Influent BOD (mg/L)	220.0		220.0				
Primary BOD (mg/L)	104.0		176.0				
Secondary BOD (mg/L)	8.0		9.0				
% PRIMARY REMOVAL	52.7		20.0				
% SECONDARY REMOVAL	96.4		95.9				
Influent SS (mg/L)	270.0	200.0	260.0	230.0	380.0		
Primary SS (mg/L)	105.0	164.0	178.0	89.0			
Secondary SS (mg/L)	9.0	6.0	6.0	5.0	6.0		
% PRIMARY REMOVAL	61.1	18.0	31.5	61.3			
% SECONDARY REMOVAL	96.7	97.0	97.7	97.8	98.4		
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)	4.70		5.20				
Primary Total P (mg/L)	3.30		5.00				
Secondary Total P (mg/L)	0.60	0.50	0.50	0.40			
% PRIMARY REMOVAL	29.8		3.8				
% SECONDARY REMOVAL	87.2		90.4				

PLANT NAME : Waterloo
PLANT TYPE : Secondary

SAMPLING TYPE : Raw Sewage
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	PLANT MIN. CONC. > MDL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0	80.00	187.00	11	11	100.0	267	266	99.6	138.79	140.23	1.37	1.93	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0	214.00	362.00	7	7	100.0	260	258	99.2	274.91	287.75	1.21	1.82	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0	12.50	46.50	11	11	100.0	271	271	100.0	22.17	22.39	1.45	1.81	100.0
NNHTPR	AMMONIUM,TOTAL FILT.REAC.	mg/L	0	10.10	18.00	11	11	100.0	275	274	99.6	14.68	15.37	1.23	1.69	100.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0	17.50	25.30	11	11	100.0	273	273	100.0	22.11	25.44	1.12	1.47	100.0
PH	(-LOG(H+(CONCN))		0	6.39	7.81	11	11	100.0	275	275	100.0	7.00	6.90	1.07	1.05	100.0
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/L	0	3.28	4.68	12	12	100.0	248	248	100.0	4.07	5.18	1.12	1.51	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0	77.90	217.00	11	11	100.0	267	266	99.6	114.88	126.88	1.35	1.93	100.0
RSPLOI	RESIDUE,PAR.LOSS ON IGNI.	mg/L	0	70.40	88.00	5	5	100.0	90	89	98.9	82.57	100.84	1.10	1.78	100.0
PHNOL	PHENOLICS (4AAP)	mg/L	0	0.76	4.20	11	6	54.6	275	37	13.5	0.60	0.31	3.69	2.05	37.8
NNO2FR	NITRITE,FILT. REACT.	mg/L	0	0.01	0.01	11	2	18.2	271	58	21.4	0.00	0.01	1.75	2.98	51.4
METALS																
CUUT	COPPER,UNFILT.TOTAL	ug/L	0	120.00	140.00	2	2	100.0	49	48	98.0	130.00	110.60	1.12	2.28	97.1
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	860.00	1680.00	13	13	100.0	319	318	99.7	1020.00	370.70	1.17	2.14	100.0
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	460.00	2400.00	13	12	92.3	322	306	95.0	640.00	1000.10	1.63	2.65	97.3
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	50.00	160.00	13	12	92.3	322	315	97.8	100.00	211.00	1.44	2.94	100.0
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	0.13	0.59	12	11	91.7	283	274	96.8	0.24	0.23	1.88	2.11	100.0
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	20.00	50.00	13	10	76.9	322	237	73.6	30.00	51.10	1.75	3.44	89.2
AGUT	SILVER,UNFILT.TOTAL	ug/L	0	20.00	90.00	13	2	15.4	321	82	25.6	10.00	10.40	2.36	2.55	75.7
COUT	COBALT,UNFILT.TOTAL	ug/L	0	20.00	50.00	13	2	15.4	322	82	25.5	10.00	9.30	2.44	2.31	83.8
MOUT	MOLYBDENUM,UNFILT.TOTAL	ug/L	0	30.00	70.00	13	2	15.4	321	41	12.8	10.00	12.40	1.86	1.72	56.8
CDUT	CADMIUM,UNFILT.TOTAL	ug/L	0	10.00	10.00	13	1	7.7	322	76	23.6	10.00	6.50	1.93	2.09	70.3
NIUT	NICKEL,UNFILT.TOTAL	ug/L	0	60.00	60.00	13	1	7.7	322	103	32.0	30.00	38.80	1.94	2.70	54.1
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PMMCRE	M-CRESOL	ug/L	1	24.80	112.60	11	10	90.9	275	167	60.7	54.41	25.59	1.79	3.45	86.5
PMPHEN	PHENOL	ug/L	2	16.60	31.30	11	7	63.6	275	118	42.9	18.95	14.52	2.35	2.46	78.4
PMBBP	BUTYLBENZYLPHTHALATE	ug/L	1	33.40	33.40	11	1	9.1	275	34	12.4	7.80	5.83	2.77	1.66	37.8
PESTICIDES,HERBICIDES,PCBS																
P24D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	0.04	0.49	11	4	36.4	276	214	77.5	0.04	0.13	2.97	3.72	100.0
P5TILV	SILVEX	ug/L	3	0.11	0.57	11	2	18.2	276	28	10.1	0.06	0.06	2.34	1.68	40.5
P1BHCG	GAMMA-BHC(HEXCHLORCYCLHEXANE)	ug/L	2	0.02	0.02	11	1	9.1	276	143	51.8	0.01	0.02	1.45	2.29	94.6
P1PPDD	PP-DDD	ug/L	1	0.02	0.02	11	1	9.1	276	6	2.2	0.01	0.01	1.45	1.38	13.5
VOLATILES ORGANIC COMPOUNDS																
BEBNZ	ETHYLBENZENE	ug/L	1	3.50	3.50	10	1	10.0	274	30	11.0	16.80	23.50	1.74	1.75	29.7
BMPXY	M-, AND P-XYLENES	ug/L	1	3.80	3.80	10	1	10.0	274	43	15.7	16.94	26.00	1.69	2.02	37.8
BOXYL	O-XYLENE	ug/L	1	4.40	4.40	10	1	10.0	274	25	9.1	17.19	22.47	1.61	1.56	26.3
X12CB	1,2-DICHLOROBENZENE	ug/L	1	42.00	42.00	10	1	10.0	274	1	0.4	21.54	20.05	1.26	1.05	2.7

PLANT NAME : Waterloo
PLANT TYPE : Secondary

SAMPLING TYPE : Final Effluent
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	STD. FOR SURFACE WATER	STD. REF.	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET.	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																		
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0		-	4.40	28.00	9	9	100.0	213	211	99.1	12.75	21.22	2.00	2.07	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0		-	14.00	56.00	7	7	100.0	213	211	99.1	29.10	52.80	1.61	1.83	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0		-	2.70	10.50	9	9	100.0	220	220	100.0	4.94	8.09	1.75	1.60	100.0
NNHTPR	AMMONIUM,TOTAL FILT.REAC.	mg/L	0		-	0.80	6.95	10	10	100.0	223	204	91.5	3.08	3.90	2.16	6.98	100.0
NNO2FR	NITRITE,FILT. REACT.	mg/L	0		-	0.11	1.79	9	9	100.0	220	194	88.2	0.37	0.22	3.00	5.95	96.4
NNO3FR	NITRATES,TOTAL FILT.REAC.	mg/L	0		-	2.15	7.05	10	10	100.0	224	186	83.0	5.02	2.33	1.51	7.75	96.4
NNTEUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0		-	2.00	7.50	10	10	100.0	222	222	100.0	4.34	7.97	1.65	2.71	100.0
PH	(-LOG(H+(CONCN))		0		-	6.52	7.86	10	10	100.0	224	224	100.0	7.25	7.10	1.06	1.05	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0		-	4.00	11.40	9	9	100.0	220	219	99.6	7.29	10.12	1.39	2.00	100.0
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/L	0		-	0.26	0.58	11	10	90.9	211	206	97.6	0.37	0.68	1.32	1.97	100.0
RSFLOI	RESIDUE,PAR.LOSS ON IGNI.	mg/L	0		-	5.30	6.50	4	2	50.0	77	58	75.3	3.55	7.47	1.80	2.71	93.3
PHNOL	PHENOLICS (4AAP)	mg/L	0	0.00	ONT-MOE	0.22	0.22	10	1	10.0	225	33	14.7	0.07	0.07	1.92	1.86	53.6
METALS																		
CUUT	COPPER,UNFILT.TOTAL	ug/L	0	5.00	ONT-MOE	10.00	10.00	2	2	100.0	47	30	63.8	10.00	13.10	1.00	2.56	77.8
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	3750.00	ONT-MOE	870.00	1850.00	11	11	100.0	267	267	100.0	1020.00	340.90	1.22	2.14	100.0
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	0.20	ONT-MOE	0.01	0.02	11	10	90.9	233	220	94.4	0.02	0.03	2.95	2.62	100.0
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	30.00	ONT-MOE	10.00	50.00	11	10	90.9	267	262	98.1	30.00	53.30	1.77	2.48	100.0
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	75.00	ONT-MOE	60.00	2200.00	11	8	72.7	264	196	74.2	100.00	101.70	3.47	3.72	98.4
MOUT	MOLYBDENUM,UNFILT.TOTAL	ug/L	0		-	10.00	20.00	11	7	63.6	267	75	28.1	10.00	6.60	1.92	1.56	67.9
NIUT	NICKEL,UNFILT.TOTAL	ug/L	0	25.00	ONT-MOE	10.00	30.00	11	7	63.6	267	171	64.0	10.00	22.10	2.62	3.80	85.7
COUT	COBALT,UNFILT.TOTAL	ug/L	0	5.00	NYS-STD	10.00	10.00	11	4	36.4	266	65	24.4	10.00	6.40	1.69	1.34	82.1
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	100.00	ONT-MOE	10.00	10.00	11	3	27.3	267	137	51.3	10.00	9.00	1.70	2.00	89.3
AGUT	SILVER,UNFILT.TOTAL	ug/L	0	0.10	ONT-MOE	10.00	10.00	11	2	18.2	267	15	5.6	10.00	6.90	1.38	1.84	32.1
CDUT	CADMIUM,UNFILT.TOTAL	ug/L	0	0.20	ONT-MOE	0.00	10.00	11	2	18.2	267	65	24.3	0.00	2.10	2.47	2.07	71.4
PBUT	LEAD,UNFILT.TOTAL	ug/L	0	25.00	ONT-MOE	30.00	30.00	11	2	18.2	267	25	9.4	20.00	16.50	1.35	1.48	60.7
PESTICIDES,HERBICIDES,PCBS																		
P1BHCG	GAMMA-BHC(HEXACHLORCYCLOHEXANE)	ug/L	2	0.08	ONT-MOE	0.02	0.02	10	5	50.0	227	157	69.2	0.01	0.02	2.08	2.48	96.4
P24D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	4.00	ONT-MOE	0.05	0.08	10	5	50.0	227	177	78.0	0.02	0.08	2.30	4.71	100.0
P1BHCB	BETA-BHC (HEXACHLORCYCLOHEXANE)	ug/L	1	0.01	ONT-MOE	0.01	0.01	10	1	10.0	227	9	4.0	0.01	0.01	1.25	1.38	21.4
VOLATILES ORGANIC COMPOUNDS																		
X1CHLO	CHLOROFORM	ug/L	1	0.20	NYS-STD	3.10	17.00	9	2	22.2	224	37	16.5	1.55	1.37	2.64	2.18	64.3
X1111T	1,1,1-TRICHLOROETHANE	ug/L	1	30.00	NYS-GUL	2.80	2.80	9	1	11.1	224	18	8.0	1.12	1.18	1.41	1.86	28.6
X1TETR	TETRACHLOROETHYLENE	ug/L	1	0.70	NYS-GUL	3.40	3.40	9	1	11.1	224	18	8.0	1.15	1.18	1.50	1.93	32.1

PLANT NAME : Waterloo
PLANT TYPE : Secondary

SAMPLING TYPE : Raw Sludge
SAMPLE FORM : Dry Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS (DRY WEIGHT)	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
COD	CHEMICAL OXYGEN DEMAND	mg/kg	0	1269035.53	1269035.53	1	1	100.0	45	45	100.0	1269035.53	892221.45	0.00	3.19	100.0
NNHTVR	AMMONIUM,TOTAL FILT.REAC.	mg/kg	0	4646.02	9746.19	2	2	100.0	48	47	97.9	6729.11	5911.32	1.69	4.59	100.0
NNOTVR	NITRATES,TOTAL FILT.REAC.	mg/kg	0	16.59	31.73	2	2	100.0	48	43	89.6	22.94	25.44	1.58	2.21	93.9
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/kg	0	37610.62	40101.52	2	2	100.0	51	51	100.0	38836.11	36897.85	1.05	2.98	100.0
PH	(-LOG)H+(CONCN))	mg/kg	0	5.44	5.83	2	2	100.0	49	49	100.0	5.63	6.03	1.05	1.10	100.0
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/kg	0	22123.89	29095.43	2	2	100.0	42	42	100.0	25631.59	20347.70	1.23	4.43	100.0
RST	RESIDUE, TOTAL	mg/kg	0	39400.00	45200.00	2	2	100.0	51	51	100.0	42200.47	32783.51	1.10	1.81	100.0
RSTLOI	RESIDUE,TOT.LOSS ON IGNI	mg/kg	0	24600.00	27300.00	2	2	100.0	51	51	100.0	25914.86	20803.05	1.08	1.77	100.0
PHENOL	PHENOLICS (4AAP)	mg/kg	0	88.50	88.50	2	1	50.0	50	41	82.0	33.51	82.34	3.95	3.54	85.3
METALS																
AGUT	SILVER,UNFILT.TOTAL	mg/kg	0	26.55	32.99	2	2	100.0	45	40	88.9	29.60	30.17	1.17	2.01	84.4
ALUT	ALUMINUM,UNFILT.TOTAL	mg/kg	0	3807.11	4646.02	2	2	100.0	51	51	100.0	4205.70	9835.74	1.15	2.51	100.0
ASUT	ARSENIC,UNFILT.TOTAL	mg/kg	0	5.33	14.38	2	2	100.0	51	50	98.0	8.75	6.13	2.02	2.01	97.1
CRUT	CHROMIUM,UNFILT.TOTAL	mg/kg	0	172.57	182.74	2	2	100.0	51	50	98.0	177.58	301.43	1.04	3.68	97.1
CUUT	COPPER,UNFILT.TOTAL	mg/kg	0	641.59	758.38	2	2	100.0	46	46	100.0	697.54	606.31	1.13	1.72	100.0
HGUT	MERCURY,UNFILT.TOTAL	mg/kg	0	1.77	1.78	2	2	100.0	50	50	100.0	1.77	2.23	1.00	1.67	100.0
NIUT	NICKEL,UNFILT.TOTAL	mg/kg	0	42.04	43.15	2	2	100.0	46	44	95.7	42.59	59.17	1.02	2.90	93.3
PBUT	LEAD,UNFILT.TOTAL	mg/kg	0	77.43	88.83	2	2	100.0	49	48	98.0	82.94	173.99	1.10	2.24	96.9
SEUT	SELENIUM,UNFILT.TOTAL	mg/kg	0	3.55	4.20	2	2	100.0	50	48	96.0	3.86	3.04	1.13	1.93	93.9
SRUT	STRONTIUM,UNFILT.TOTAL	mg/kg	0	309.73	431.47	2	2	100.0	51	51	100.0	365.57	231.70	1.26	1.97	100.0
ZNUT	ZINC,UNFILT.TOTAL	mg/kg	0	355.33	530.97	2	2	100.0	51	51	100.0	434.36	905.39	1.33	2.39	100.0
COUT	COBALT,UNFILT.TOTAL	mg/kg	0	5.58	5.58	2	1	50.0	41	30	73.2	1.76	9.29	5.13	4.69	73.3
MOUT	MOLYBDENUM,UNFILT.TOTAL	mg/kg	0	8.12	8.12	2	1	50.0	37	23	62.2	3.00	5.80	4.09	2.88	64.3
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PMMCRE	M-CRESOL	ug/kg	1	280973.50	8786802.00	2	2	100.0	51	42	82.3	1571260.20	116847.30	11.41	12.16	85.3
PMBBP	BUTYLBENZYLPHTHALATE	ug/kg	1	20132.00	20132.00	2	1	50.0	51	4	7.8	6673.80	3445.60	4.77	2.25	11.8
PMPHEN	PHENOL	ug/kg	2	23819.80	23819.80	2	1	50.0	51	15	29.4	8890.90	7312.80	4.05	3.00	38.2
DIOXINS AND FURANS																
P94CDF	TETRACHLORODIBENZOFURAN	ug/kg	2	25.40	25.40	2	1	50.0	50	3	6.0	2.80	2.40	23.07	2.94	8.8
P98CDD	OCTACHLORODIBENZODIOXIN	ug/kg	1	2.40	2.40	2	1	50.0	50	25	50.0	3.90	8.50	1.98	3.60	58.8
PESTICIDES,HERBICIDES,PCBS																
P1PCBT	PCB, TOTAL	ug/kg	2	28.80	253.80	2	2	100.0	51	40	78.4	85.50	88.70	4.66	3.18	79.4
P3245T	2,4,5-TRICHLORPHENOXYACETIC ACID	ug/kg	3	31.00	433.00	2	2	100.0	51	21	41.2	115.90	48.90	6.45	3.49	47.1
P1DIEL	DIELDRIN	ug/kg	2	7.60	7.60	2	1	50.0	51	20	39.2	4.10	7.20	2.40	3.10	50.0
P1ENDR	ENDRIN	ug/kg	3	5.10	5.10	2	1	50.0	51	8	15.7	3.30	4.20	1.81	2.21	23.5
P1HEPE	HEPTACHLOREPOXIDE	ug/kg	2	5.10	5.10	2	1	50.0	51	12	23.5	3.30	5.00	1.81	2.62	32.4
P1PPDE	PP-DDE	ug/kg	1	27.90	27.90	2	1	50.0	51	22	43.1	7.80	7.30	6.03	2.31	52.9
P324D	2,4-DICHLOROPHENOXYACETIC ACID	ug/kg	3	174.10	174.10	2	1	50.0	51	38	74.5	27.70	93.20	13.47	6.50	82.3
P3SILV	SILVEX	ug/kg	3	170.10	170.10	2	1	50.0	51	23	45.1	43.50	47.30	6.89	3.40	55.9

PLANT NAME : Waterloo
PLANT TYPE : Secondary

SAMPLING TYPE : Treated Sludge
SAMPLE FORM : Dry Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS (DRY WEIGHT)	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
COD	CHEMICAL OXYGEN DEMAND	mg/kg	0	1132663.32	1132663.32	1	1	100.0	36	36	100.0	1132663.32	508097.94	0.00	4.65	100.0
NNHTPR	AMMONIUM,TOTAL FIL.T.REAC.	mg/kg	0	30167.22	40653.27	2	2	100.0	25	25	100.0	35019.94	17658.28	1.23	2.92	100.0
NNOTPR	NITRATES,TOTAL FIL.T.REAC.	mg/kg	0	45.15	100.50	2	2	100.0	26	23	88.5	67.36	42.68	1.76	2.29	95.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/kg	0	55183.95	65326.63	2	2	100.0	49	49	100.0	60041.50	38494.12	1.13	1.77	100.0
PH	(-1.OG(H+(CONCN))	mg/kg	0	5.95	7.39	2	2	100.0	47	47	100.0	6.63	7.17	1.17	1.09	100.0
PPUT	PHOSPHORUS,UNFIL.T.TOTAL	mg/kg	0	20903.01	33919.60	2	2	100.0	43	43	100.0	28627.46	76638.67	1.41	6.91	100.0
RST	RESIDUE, TOTAL	mg/kg	0	19900.00	29900.00	2	2	100.0	50	50	100.0	24392.83	80434.04	1.33	3.23	100.0
RSTLOI	RESIDUE,TOT.LOSS ON IGNI	mg/kg	0	11200.00	13800.00	2	2	100.0	50	50	100.0	12432.22	43379.33	1.16	3.19	100.0
METALS																
AGUT	SILVER,UNFIL.T.TOTAL	mg/kg	0	33.44	55.28	2	2	100.0	44	44	100.0	43.00	37.78	1.43	2.33	100.0
ALUT	ALUMINUM,UNFIL.T.TOTAL	mg/kg	0	6532.66	7357.86	2	2	100.0	50	50	100.0	6932.99	10715.94	1.09	2.82	100.0
ASUT	ARSENIC,UNFIL.T.TOTAL	mg/kg	0	13.57	15.72	2	2	100.0	50	49	98.0	14.60	5.40	1.11	2.06	97.1
CDUT	CADMIUM,UNFIL.T.TOTAL	mg/kg	0	1.87	1.87	1	1	100.0	45	41	91.1	1.87	10.47	0.00	3.98	90.3
COUT	COBALT,UNFIL.T.TOTAL	mg/kg	0	2.34	9.05	2	2	100.0	39	32	82.1	4.60	9.14	2.60	2.75	85.7
CRUT	CHROMIUM,UNFIL.T.TOTAL	mg/kg	0	237.46	286.43	2	2	100.0	50	50	100.0	260.80	333.06	1.14	3.59	100.0
CUUT	COPPER,UNFIL.T.TOTAL	mg/kg	0	903.01	1088.44	2	2	100.0	45	45	100.0	991.40	732.24	1.14	2.16	100.0
HGUT	MERCURY,UNFIL.T.TOTAL	mg/kg	0	2.51	4.01	2	2	100.0	50	49	98.0	3.18	3.24	1.39	2.04	97.1
NIUT	NICKEL,UNFIL.T.TOTAL	mg/kg	0	60.20	201.01	2	2	100.0	45	42	93.3	110.00	72.95	2.35	2.95	90.0
PBUT	LEAD,UNFIL.T.TOTAL	mg/kg	0	93.65	160.80	2	2	100.0	50	49	98.0	122.71	196.62	1.47	2.46	97.1
SEUT	SELENIUM,UNFIL.T.TOTAL	mg/kg	0	5.03	5.69	2	2	100.0	50	48	96.0	5.35	2.67	1.09	2.98	97.1
SRUT	STRONTIUM,UNFIL.T.TOTAL	mg/kg	0	434.78	653.27	2	2	100.0	50	50	100.0	532.94	240.93	1.33	2.54	100.0
ZNUT	ZINC,UNFIL.T.TOTAL	mg/kg	0	635.45	703.52	2	2	100.0	50	50	100.0	668.62	988.90	1.07	2.57	100.0
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PMMCRE	M-CRESOL	ug/kg	1	15561.90	24587.90	2	2	100.0	50	15	30.0	19561.00	5281.80	1.38	6.20	35.3
DIOXINS AND FURANS																
P98CDD	OCTACHLORODIBENZODIOXIN	ug/kg	1	3.30	3.30	2	1	50.0	49	26	53.1	5.80	7.10	2.21	3.84	64.7
PESTICIDES,HERBICIDES,PCBS																
P1PCRT	PCB, TOTAL	ug/kg	2	46.80	341.70	2	2	100.0	50	32	64.0	126.50	114.10	4.08	4.58	67.7
P1SILV	SILVEX	ug/kg	5	56.90	1264.80	2	2	100.0	50	18	36.0	268.30	92.70	8.96	2.94	44.1
P1PMIR	MIREX PHOTO	ug/kg	2	85.40	85.40	2	1	50.0	50	2	4.0	16.80	3.90	9.98	2.25	5.9
P1PPDD	PP-DDD	ug/kg	1	70.40	70.40	2	1	50.0	50	34	68.0	15.20	11.10	8.71	2.72	73.5
P245T	2,4,5-TRICHLOROPHENOXYACETIC ACID	ug/kg	3	374.90	374.90	2	1	50.0	50	16	32.0	79.10	84.40	9.02	3.13	41.2
P24D	2,4-DICHLOROPHENOXYACETICACID	ug/kg	3	150.80	150.80	2	1	50.0	50	25	50.0	31.80	75.00	9.04	5.81	64.7
X2124	1,2,4-TRICHLOROBENZENE	ug/kg	3	20.10	20.10	2	1	50.0	50	22	44.0	8.10	14.80	3.98	5.02	52.9
X2HCB	HEXACHLOROBENZENE	ug/kg	2	10.10	10.10	2	1	50.0	50	21	42.0	5.80	7.00	2.21	2.96	55.9

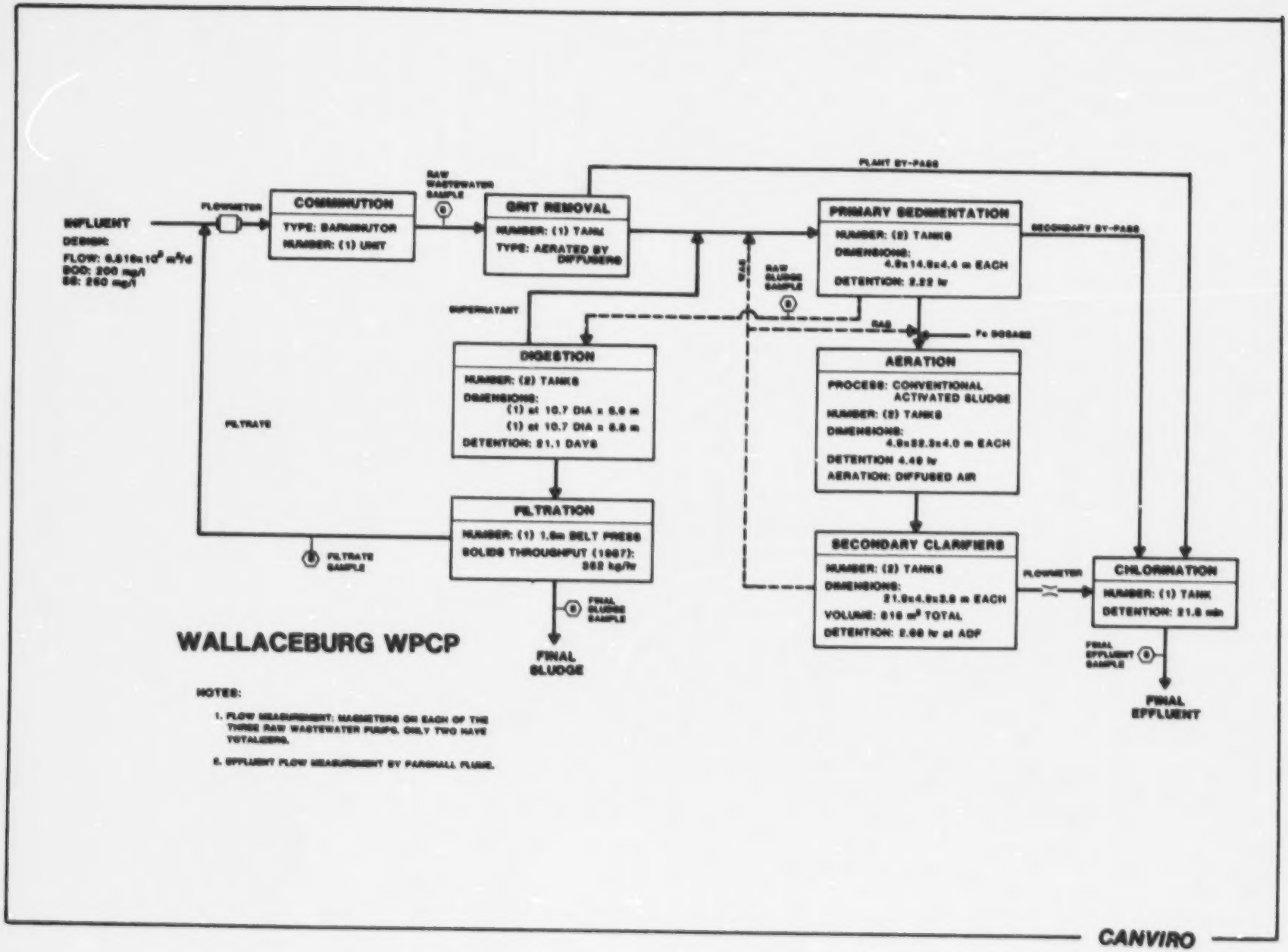
Sub-Appendix A-34

Wallaceburg WPCP

Contents:

- Plant Schematic with Design Characteristics
- Annual Data Review (1981 - 1986 Plant Performance)
- Sources of Municipal Water Pollution Control Plant Raw Sewage
- Operational Evaluation for Wallaceburg WPCP
- Analytical Data

(KIR18/28A)


INFLUENT
DESIGN:
FLOW: 6.816x10³ m³/d
BOD: 200 mg/l
SS: 250 mg/l
FLOWMETER
COMMINUTION
TYPE: BARMINUTOR
NUMBER: (1) UNIT
RAW WASTEWATER SAMPLE
GRIT REMOVAL
NUMBER: (1) TANK
TYPE: AERATED BY DIFFUSERS
PLANT BY-PASS
PRIMARY SEDIMENTATION
NUMBER: (2) TANKS
DIMENSIONS: 4.0x14.0x4.4 m EACH
DETENTION: 2.22 hr
SECONDARY BY-PASS
RAW SLUDGE SAMPLE
SUPERNATANT
DIGESTION
NUMBER: (2) TANKS
DIMENSIONS:
(1) at 10.7 DIA x 6.0 m
(1) at 10.7 DIA x 6.0 m
DETENTION: 21.1 DAYS
FILTRATE
FILTRATE SAMPLE
FILTRATION
NUMBER: (1) 1.0m BELT PRESS
SOLIDS THROUGHPUT (1987): 362 kg/hr
FINAL SLUDGE SAMPLE
FINAL SLUDGE
AERATION
PROCESS: CONVENTIONAL ACTIVATED SLUDGE
NUMBER: (2) TANKS
DIMENSIONS: 4.0x32.3x4.0 m EACH
DETENTION 4.48 hr
AERATION: DIFFUSED AIR
SECONDARY CLARIFIERS
NUMBER: (2) TANKS
DIMENSIONS: 21.0x4.0x3.0 m EACH
VOLUME: 616 m³ TOTAL
DETENTION: 2.66 hr at ADF
FLOWMETER
CHLORINATION
NUMBER: (1) TANK
DETENTION: 21.0 min
FINAL EFFLUENT SAMPLE
FINAL EFFLUENT
WALLACEBURG WPCP
NOTES:
1. FLOW MEASUREMENT: MAGMETERS ON EACH OF THE THREE RAW WASTEWATER PUMPS. ONLY TWO HAVE TOTALIZERS.
2. EFFLUENT FLOW MEASUREMENT BY PARSHALL FLUME.
CANVIRO

WALLACEBURG WPCP
Conventional Activated Sludge
Phosphorus Removal - Continuous
Capacity - 6.819 10(3)m3/day

PARAMETER	1981	1982	1983	1984	1985	MEAN ANNUAL AVERAGE
Avg. Daily Flow (1000 m3/day)	6.15	5.68	6.12	5.48	8.87	6.46
BOD5 - Influent (mg/L)	117.63	118.58	117.58	125.75	104.00	116.69
BOD5 - Effluent (mg/L)	6.43	5.17	3.58	8.00	12.10	7.07
Annual BOD5 Significantly Different from Mean Annual Average BOD5?	N	N	Y	N	Y	
TSS - Influent (mg/L)	167.09	183.00	175.00	173.92	167.00	173.38
TSS - Effluent (mg/L)	8.39	8.05	5.15	7.48	8.05	7.72
Annual TSS Significantly Different from Mean Annual Average TSS?	N	N	Y	N	N	
Total P - Influent (mg/L)	4.54	5.09	4.92	4.23	3.73	4.54
Total P - Effluent (mg/L)	1.17	0.90	0.33	0.67	0.42	0.72
Annual TP Significantly Different from Mean Annual Average TP?	Y	N	Y	N	N	
TP in Compliance?	N	Y	Y	Y	Y	Y

I.D. - Insufficient Data

R

SOURCES OF MUNICIPAL WATER POLLUTION CONTROL PLANT RAW SEWAGE

GENERAL DESCRIPTION OF WATER POLLUTION CONTROL PLANT (WPCP)

NAME OF WPCP	WALLACEBURG WPCP
WORKS NUMBER	110000784
TREATMENT TYPE	CONVENTIONAL ACTIVATED SLUDGE PHOSPHORUS REMOVAL CONTINUOUS
DESIGN CAPACITY (1000 m3/d)	6.819
1986 AVERAGE DAY FLOW (1000 m3/d)	8.222
POPULATION SERVED	9200

% OF TOTAL FLOW ATTRIBUTED TO:

INDUSTRIAL SOURCES (%)	37
COMMERCIAL SOURCES (%) (Population x 0.0757)	8
RESIDENTIAL SOURCES (%) (Population x 0.175)	20
UNACCOUNTED FOR, INCL. INFILTRATION (100-% Contributed from industrial, commercial and residential sources)	35

PROFILE OF INDUSTRIES IN THE CATCHMENT
PROFILE OF INDUSTRIES IN CATCHMENT

TOTAL NO OF INDUSTRIES	50
INDUSTRIES WITH WATER	31
NO OF SIC CATEGORIES	26

DESCRIPTION OF THE TOP 5 INDUSTRIES DISCHARGED TO THE WPCP (BASED ON WATER USE DATA)

DESCRIPTION	SIC	# OF companies
TRANSPORTATION EQUIPMENT	3711-3799	2
GLASS MFG	3211-3229	1
ELECTROPLATING	3471-3471	2
MISC. FABRICATED METALS PRD	3490-3499	1
METAL FINISHING	3411-3469	3

R

OPERATIONAL EVALUATION FOR: WALLACEBURG WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: Feb. 6, 1987
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: 6,819 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
RAW SEWAGE FLOW	7,205	7,974	6,954	7,567	6,707	6,630	6,351
% of Design Flow	105.66%	116.94%	101.98%	110.97%	98.36%	97.23%	93.14%
Influent BOD (mg/L)	97.0		80.0				
Primary BOD (mg/L)			95.0				
Secondary BOD (mg/L)	17.0		1.0				
% PRIMARY REMOVAL			-18.8				
% SECONDARY REMOVAL	82.5		98.8				
Influent SS (mg/L)	132.0	163.0	146.0	187.0	166.0		
Primary SS (mg/L)	110.0	84.0	72.0	70.0	79.0		
Secondary SS (mg/L)	17.0	10.0	9.0	10.0	19.0		
% PRIMARY REMOVAL	16.7	48.5	50.7	62.6	52.4		
% SECONDARY REMOVAL	87.1	93.9	93.8	94.7	88.6		
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)	9.9						
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)	19.0						
Primary TKN (mg/L)							
Secondary TKN (mg/L)	13.2						
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	30.5						
Influent Total P (mg/L)	3.40						
Primary Total P (mg/L)							
Secondary Total P (mg/L)	0.23						
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	93.2						

OPERATIONAL EVALUATION FOR: WALLACEBURG WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: Feb. 6, 1987
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: 6,819 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 8	DAY 9	DAY 10	DAY 11	DAY 12	DAY 13	DAY 14
RAW SEWAGE FLOW	8,246	6,912	7,902	7,721	7,104	5,574	5,749
% of Design Flow	120.93%	101.36%	115.88%	113.23%	104.18%	81.74%	84.31%
Influent BOD (mg/L)			80.0				
Primary BOD (mg/L)			75.0				
Secondary BOD (mg/L)			5.0				
% PRIMARY REMOVAL			6.3				
% SECONDARY REMOVAL			93.8				
Influent SS (mg/L)	141.0		153.0	166.0	107.0		
Primary SS (mg/L)	78.0	80.0	89.0	61.0	53.0		
Secondary SS (mg/L)	12.0	11.0	14.0	11.0	9.0		
% PRIMARY REMOVAL	44.7		41.8	63.3	50.5		
% SECONDARY REMOVAL	91.5		90.8	93.4	91.6		
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)			9.8				
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)			19.5				
Primary TKN (mg/L)							
Secondary TKN (mg/L)			13.8				
% PRIMARY REMOVAL							
% SECONDARY REMOVAL			29.2				
Influent Total P (mg/L)			3.50				
Primary Total P (mg/L)							
Secondary Total P (mg/L)			0.26				
% PRIMARY REMOVAL							
% SECONDARY REMOVAL			92.6				

OPERATIONAL EVALUATION FOR: W A L L A C E B U R G W P C P

TREATMENT FACILITY: Secondary
PERIOD ENDING: Feb. 6, 1987
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: 6,819 m3/d

PARAMETER	SAMPLING PERIOD						
	DAY 15	DAY 16	DAY 17	DAY 18	DAY 19	DAY 20	DAY 21
RAW SEWAGE FLOW	7,254	6,234	7,356	6,191	7,205		
% of Design Flow	106.38%	91.42%	107.88%	90.79%	105.66%		
Influent BOD (mg/L)							
Primary BOD (mg/L)							
Secondary BOD (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent SS (mg/L)	152.0	175.0	151.0	107.0	157.0		
Primary SS (mg/L)							
Secondary SS (mg/L)	13.0	10.0	12.0	11.0	18.0		
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	91.4	94.3	92.1	89.7	88.5		
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)			12.3				
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)			22.0				
Primary TKN (mg/L)							
Secondary TKN (mg/L)			15.0				
% PRIMARY REMOVAL							
% SECONDARY REMOVAL			31.8				
Influent Total P (mg/L)			4.10				
Primary Total P (mg/L)							
Secondary Total P (mg/L)			0.70				
% PRIMARY REMOVAL							
% SECONDARY REMOVAL			82.9				

PLANT NAME : Wallaceburg
PLANT TYPE : Secondary

SAMPLING TYPE : Raw Sewage
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	PLANT MIN. CONC. > IDL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0	62.00	87.40	5	5	100.0	267	266	99.6	73.88	140.23	1.16	1.93	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0	148.00	266.00	5	5	100.0	260	258	99.2	211.75	287.75	1.29	1.82	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0	19.80	22.00	5	5	100.0	271	271	100.0	21.09	22.39	1.06	1.81	100.0
NNHTPR	AMMONIUM,TOTAL FILT.REAC.	mg/L	0	15.40	20.50	5	5	100.0	275	274	99.6	18.38	15.37	1.14	1.69	100.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0	21.40	28.80	5	5	100.0	273	273	100.0	25.34	25.44	1.15	1.47	100.0
PH	(-LOG(H+(CONCN))		0	6.83	7.25	5	5	100.0	275	275	100.0	6.95	6.90	1.02	1.05	100.0
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/L	0	3.79	4.90	6	6	100.0	268	268	100.0	4.25	5.18	1.12	1.51	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0	75.80	91.70	5	5	100.0	267	266	99.6	83.84	126.88	1.08	1.93	100.0
NNOTPR	NITRATES,TOTAL FILT.REAC.	mg/L	0	0.25	0.25	5	1	20.0	275	28	10.2	0.06	0.05	2.59	2.33	32.4
METALS																
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	500.00	930.00	6	6	100.0	322	306	95.0	700.00	1000.10	1.28	2.65	97.3
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	440.00	740.00	6	6	100.0	322	237	73.6	560.00	51.10	1.25	3.44	89.2
CUUT	COPPER,UNFILT.TOTAL	ug/L	0	590.00	590.00	1	1	100.0	49	48	98.0	590.00	110.60	0.00	2.28	97.1
NIUT	NICKEL,UNFILT.TOTAL	ug/L	0	480.00	1500.00	6	6	100.0	322	103	32.0	870.00	38.80	1.57	2.70	54.1
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	260.00	400.00	6	6	100.0	319	318	99.7	290.00	370.70	1.17	2.14	100.0
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	50.00	250.00	6	6	100.0	322	315	97.8	120.00	211.00	1.69	2.94	100.0
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	0.10	0.13	6	5	83.3	283	274	96.8	0.16	0.23	2.49	2.11	100.0
CCNFUR	CYANIDE-FREE,UNFILT.REAC.	ug/L	0	10.00	10.00	5	3	60.0	271	82	30.3	0.00	1.90	2.44	6.88	32.4
AGUT	SILVER,UNFILT.TOTAL	ug/L	0	20.00	20.00	6	1	16.7	321	82	25.6	10.00	10.40	2.17	2.55	75.7
COUT	COBALT,UNFILT.TOTAL	ug/L	0	20.00	20.00	6	1	16.7	322	82	25.5	10.00	9.30	2.71	2.31	83.8
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PN4NP	4-NITROPHENOL	ug/L	2	31.50	31.50	5	1	20.0	275	3	1.1	15.04	12.65	1.51	1.29	8.1
PN4MCRE	4-CRESOL	ug/L	1	25.90	25.90	5	1	20.0	275	167	60.7	9.41	25.59	1.74	3.45	86.5
PESTICIDES,HERBICIDES,PCBS																
P24D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	0.06	0.15	5	3	60.0	276	214	77.5	0.05	0.13	2.56	3.72	100.0
P1BHCG	GAMMA-BHC(HEXCHLORCYCLHEXANE)	ug/L	2	0.04	0.06	5	2	40.0	276	143	51.8	0.02	0.02	2.42	2.29	94.6
P1DMDT	METHOXYCHLOR	ug/L	1	0.10	0.10	5	1	20.0	276	47	17.0	0.06	0.08	1.36	3.14	43.2
P5SILV	SILVEX	ug/L	3	0.10	0.10	5	1	20.0	276	28	10.1	0.06	0.06	1.36	1.68	40.5

PLANT NAME : Wallaceburg
PLANT TYPE : Secondary

SAMPLING TYPE : Final Effluent
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	STD. FOR SURFACE WATER	STD. REF.	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET.	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																		
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0		-	6.70	16.70	5	5	100.0	213	211	99.1	9.72	21.22	1.41	2.07	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0		-	42.00	74.00	5	5	100.0	213	211	99.1	57.00	52.80	1.33	1.83	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0		-	10.20	11.10	5	5	100.0	220	220	100.0	10.64	8.09	1.03	1.60	100.0
NNHTPR	AMMONIUM,TOTAL FILT.REAC.	mg/L	0		-	13.70	19.90	5	5	100.0	223	204	91.5	16.73	3.90	1.18	6.98	100.0
NNO2FR	NITRITE,FILT. REACT.	mg/L	0		-	0.21	0.40	5	5	100.0	220	194	88.2	0.29	0.22	1.28	5.95	96.4
NNOTPR	NITRATES,TOTAL FILT.REAC.	mg/L	0		-	0.25	0.80	5	5	100.0	224	186	83.0	0.47	2.33	1.52	7.75	96.4
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0		-	15.20	22.70	5	5	100.0	222	222	100.0	19.16	7.97	1.19	2.71	100.0
PH	(-LOG(H+(CONCN))		0		-	7.04	7.64	5	5	100.0	224	224	100.0	7.27	7.10	1.03	1.05	100.0
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/L	0		-	0.38	0.95	6	6	100.0	211	206	97.6	0.55	0.68	1.41	1.97	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0		-	5.80	7.80	5	5	100.0	220	219	99.6	6.45	10.12	1.14	2.00	100.0
METALS																		
CUUT	COPPER,UNFILT.TOTAL	ug/L	0	5.00	ONT-MOE	190.00	190.00	1	1	100.0	47	30	63.8	190.00	13.10	0.00	2.56	77.8
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	7750.00	ONT-MOE	200.00	420.00	6	6	100.0	267	267	100.0	240.00	340.90	1.32	2.14	100.0
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	30.00	ONT-MOE	30.00	80.00	6	6	100.0	267	262	98.1	50.00	53.30	1.52	2.48	100.0
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	100.00	ONT-MOE	20.00	40.00	6	5	83.3	267	137	51.3	30.00	9.00	1.34	2.00	89.3
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	0.20	NT-MOE	0.01	0.02	6	5	83.3	233	220	94.4	0.03	0.03	4.34	2.62	100.0
NIUT	NICKEL,UNFILT.TOTAL	ug/L	0	25.00	ONT-MOE	240.00	900.00	6	5	83.3	267	171	64.0	440.00	22.10	1.74	3.60	85.7
CCNFUR	CYANIDE-FREE,UNFILT.REAC.	ug/L	0	5.00	ONT-MOE	10.00	30.00	5	3	60.0	222	42	18.9	10.00	1.30	4.84	3.68	46.4
COUT	COBALT,UNFILT.TOTAL	ug/L	0	5.00	NYS-STD	10.00	10.00	6	2	33.3	266	65	24.4	10.00	6.40	1.90	1.54	82.1
PBUT	LEAD,UNFILT.TOTAL	ug/L	0	25.00	ONT-MOE	30.00	50.00	6	2	33.3	267	25	9.4	20.00	16.50	1.64	1.48	60.7
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	75.00	ONT-MOE	140.00	140.00	6	1	16.7	264	196	74.2	50.00	101.70	1.94	3.72	96.4
PESTICIDES,HERBICIDES,PCBS																		
P1BHCO	GAMMA-BHC(HEXCHLORCYCLHEXANE)	ug/L	2	0.06	ONT-MOE	0.02	0.07	5	4	80.0	227	157	69.2	0.03	0.02	2.79	2.48	96.4
P24D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	4.00	ONT-MOE	0.02	0.03	5	2	40.0	227	177	78.0	0.01	0.08	1.67	4.71	100.0
VOLATILES ORGANIC COMPOUNDS																		
X1TRIC	TRICHLOROETHYLENE	ug/L	1	3.00	NYS-GUI.	2.20	3.10	5	5	100.0	224	17	7.6	2.60	1.12	1.13	1.35	21.4
X1CHLO	CHLOROFORM	ug/L	1	0.20	NYS-STD	3.90	20.00	5	3	60.0	224	37	16.5	3.20	1.37	3.47	2.18	64.3
X112CE	1,2-DICHLOROETHANE	ug/L	1	0.80	NYS-STD	2.00	2.00	5	1	20.0	224	4	1.8	1.15	1.03	1.36	1.30	10.7

PLANT NAME : Wallaceburg
PLANT TYPE : Secondary

SAMPLING TYPE : Recycle
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	PLANT MIN. CONC. > MDL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0	484.00	531.00	2	2	100.0	20	20	100.0	506.96	905.21	1.07	2.32	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0	166.00	1780.00	3	3	100.0	39	39	100.0	650.60	3439.26	3.41	4.55	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0	75.60	124.00	3	3	100.0	42	42	100.0	93.11	77.62	1.29	3.54	100.0
NNHTPR	AMMONIUM,TOTAL PILT.REAC.	mg/L	0	326.00	419.00	3	3	100.0	44	44	100.0	371.38	146.20	1.13	2.07	100.0
NNOTPR	NITRATES,TOTAL PILT.REAC.	mg/L	0	0.65	1.35	3	3	100.0	44	39	88.6	1.02	0.41	1.55	2.66	100.0
NNTKUR	NITROGEN-TOT-KJEL,UNP.TOT	mg/L	0	388.00	450.00	2	2	100.0	42	42	100.0	417.85	326.28	1.11	1.95	100.0
PH	(-LOG(H+(CONCN))		0	7.38	7.76	3	3	100.0	44	44	100.0	7.56	6.94	1.03	1.05	100.0
PPUT	PHOSPHORUS,UNPILT.TOTAL	mg/L	0	1.60	44.10	4	4	100.0	43	43	100.0	13.90	53.83	4.70	4.47	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0	482.00	1490.00	3	3	100.0	42	42	100.0	811.83	2242.77	1.77	3.60	100.0
NNO2PR	NITRITE,FILT. REACT.	mg/L	0	0.03	0.04	3	2	66.7	42	36	85.7	0.02	0.05	2.25	3.13	100.0
METALS																
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	6600.00	19000.00	4	4	100.0	53	53	100.0	10540.00	28798.20	1.68	4.42	100.0
CAUT	CALCIUM,UNFILT.TOTAL	ug/L	0	213860.00	325000.00	4	4	100.0	54	54	100.0	279030.00	208447.60	1.20	1.87	100.0
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	6290.00	12000.00	4	4	100.0	53	51	96.2	9550.00	874.70	1.33	6.11	100.0
CUUT	COPPER,UNFILT.TOTAL	ug/L	0	4140.00	4140.00	1	1	100.0	12	12	100.0	4140.00	1814.00	0.00	5.64	100.0
FEUT	IRON,UNFILT.TOTAL	ug/L	0	103800.00	220000.00	4	4	100.0	53	53	100.0	154110.00	109943.30	1.41	4.19	100.0
MGUT	MAGNESIUM,UNFILT.TOTAL	ug/L	0	23810.00	37000.00	4	4	100.0	54	54	100.0	32680.00	41620.20	1.24	1.78	100.0
NIUT	NICKEL,UNFILT.TOTAL	ug/L	0	2990.00	4800.00	4	4	100.0	53	41	77.4	3960.00	308.60	1.23	3.08	88.9
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	900.00	1170.00	4	4	100.0	53	53	100.0	1010.00	1347.00	1.15	2.13	100.0
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	940.00	3200.00	4	4	100.0	53	53	100.0	1920.00	3112.40	1.70	7.41	100.0
AGUT	SILVER,UNFILT.TOTAL	ug/L	0	20.00	200.00	4	3	75.0	53	42	79.3	40.00	72.30	2.89	4.09	100.0
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	0.55	5.00	4	3	75.0	47	44	93.6	1.49	1.68	2.56	4.49	100.0
PBUT	LEAD,UNFILT.TOTAL	ug/L	0	220.00	470.00	4	3	75.0	53	36	67.9	330.00	429.50	1.38	6.62	100.0
CCNPUR	CYANIDE-FREE,UNFILT.REAC.	ug/L	0	10.00	10.00	3	1	33.3	43	17	39.5	0.00	4.00	1.95	5.19	66.7
ASUT	ARSENIC,UNFILT.TOTAL	ug/L	0	30.00	30.00	4	1	25.0	51	27	52.9	40.00	37.50	5.31	2.92	66.7
COUT	COBALT,UNFILT.TOTAL	ug/L	0	150.00	150.00	4	1	25.0	53	21	39.6	20.00	23.60	5.51	4.63	88.9
MOUT	MOLYBDENUM,UNFILT.TOTAL	ug/L	0	260.00	260.00	4	1	25.0	54	18	33.3	20.00	35.60	5.10	4.15	77.8
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PM4CRE	M-CRESOL	ug/L	1	249.50	3300.00	3	3	100.0	43	27	62.8	739.92	562.69	3.81	5.65	88.9
PESTICIDES,HERBICIDES,PCBS																
P24D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	0.25	3.90	3	3	100.0	44	29	65.9	0.62	0.79	4.88	5.21	88.9
P245T	2,4,5-TRICLORPHENOXYACETIC ACID	ug/L	3	0.21	0.21	3	1	33.3	44	18	40.9	0.17	0.43	3.20	4.50	77.8

PLANT NAME : Wallaceburg
PLANT TYPE : Secondary

SAMPLING TYPE : Raw Sludge
SAMPLE FORM : Dry Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS (DRY WEIGHT)	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
COD	CHEMICAL OXYGEN DEMAND	mg/kg	0	1128823.53	1128823.53	1	1	100.0	45	45	100.0	1128823.53	892221.45	0.00	3.19	100.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/kg	0	33400.00	33400.00	1	1	100.0	51	51	100.0	33400.00	36897.85	0.00	2.98	100.0
PH	(-LOG(H+(CONCN))	mg/kg	0	6.40	6.40	1	1	100.0	49	49	100.0	6.40	6.03	0.00	1.10	100.0
PHNOL	PHENOLICS (4AAP)	mg/kg	0	79.41	79.41	1	1	100.0	50	41	82.0	79.41	82.34	0.00	3.54	85.3
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/kg	0	27810.00	27810.00	1	1	100.0	42	42	100.0	27810.00	20347.70	0.00	4.43	100.0
RST	RESIDUE, TOTAL	mg/kg	0	34000.00	34000.00	1	1	100.0	51	51	100.0	34000.00	32783.51	0.00	1.81	100.0
RSTLOI	RESIDUE,TOT.LOSS ON IGNI.	mg/kg	0	20502.00	20502.00	1	1	100.0	51	51	100.0	20502.00	20803.05	0.00	1.77	100.0
METALS																
AGUT	SILVER,UNFILT.TOTAL	mg/kg	0	15.88	15.88	1	1	100.0	45	40	88.9	15.88	30.17	0.00	2.61	84.4
ALUT	ALUMINUM,UNFILT.TOTAL	mg/kg	0	7647.06	7647.06	1	1	100.0	51	51	100.0	7647.06	9835.74	0.00	2.51	100.0
ASUT	ARSENIC,UNFILT.TOTAL	mg/kg	0	7.06	7.06	1	1	100.0	51	50	98.0	7.06	6.13	0.00	2.01	97.1
COUT	COBALT,UNFILT.TOTAL	mg/kg	0	11.76	11.76	1	1	100.0	41	30	73.2	11.76	9.29	0.00	4.69	73.3
CRUT	CHROMIUM,UNFILT.TOTAL	mg/kg	0	8235.29	8235.29	1	1	100.0	51	50	98.0	8235.29	301.43	0.00	3.68	97.1
CUUT	COPPER,UNFILT.TOTAL	mg/kg	0	4055.88	4055.88	1	1	100.0	46	46	100.0	4055.88	606.31	0.00	1.72	100.0
HGUT	MERCURY,UNFILT.TOTAL	mg/kg	0	1.47	1.47	1	1	100.0	50	50	100.0	1.47	2.23	0.00	1.67	100.0
MOUT	MOLYBDENUM,UNFILT.TOTAL	mg/kg	0	10.29	10.29	1	1	100.0	37	23	62.2	10.29	5.80	0.00	2.88	64.3
NIUT	NICKEL,UNFILT.TOTAL	mg/kg	0	2558.82	2558.82	1	1	100.0	46	44	95.7	2558.82	59.17	0.00	2.90	93.3
PBUT	LEAD,UNFILT.TOTAL	mg/kg	0	208.82	208.82	1	1	100.0	49	48	98.0	208.82	173.99	0.00	2.24	96.9
SEUT	SELENIUM,UNFILT.TOTAL	mg/kg	0	3.24	3.24	1	1	100.0	50	48	96.0	3.24	3.04	0.00	1.93	93.9
SRUT	STRONTIUM,UNFILT.TOTAL	mg/kg	0	208.82	208.82	1	1	100.0	51	51	100.0	208.82	231.70	0.00	1.97	100.0
ZNUT	ZINC,UNFILT.TOTAL	mg/kg	0	911.76	911.76	1	1	100.0	51	51	100.0	911.76	905.39	0.00	2.39	100.0
	PESTICIDES,HERBICIDES,PCBS															
P1BHCG	GAMMA-BHC(HEXCHLORCYCLOHEXANE)	ug/kg	2	11.80	11.80	1	1	100.0	51	28	54.9	11.80	8.90	0.00	2.69	67.7
P1CHLA	ALPHA-CHLORDANE	ug/kg	1	8.80	8.80	1	1	100.0	51	18	35.3	8.80	5.90	0.00	2.38	47.1
P1CHLG	GAMMA-CHLORDANE	ug/kg	1	8.80	8.80	1	1	100.0	51	19	37.3	8.80	6.00	0.00	2.44	50.0
P1HEPT	HEPTACHLOR	ug/kg	3	5.90	5.90	1	1	100.0	51	7	13.7	5.90	4.50	0.00	2.83	20.6
P1OCHL	OXYCHLORDANE	ug/kg	2	8.80	8.80	1	1	100.0	51	8	15.7	8.80	4.50	0.00	2.27	20.6
P1PCBT	PCB, TOTAL	ug/kg	2	73.50	73.50	1	1	100.0	51	40	78.4	73.50	88.70	0.00	3.18	79.4
P1PPDE	PP-DDE	ug/kg	1	8.80	8.80	1	1	100.0	51	22	43.1	8.80	7.30	0.00	2.31	52.9
P245T	2,4,5-TRICHLORPHENOXYACETIC ACID	ug/kg	3	41.20	41.20	1	1	100.0	51	21	41.2	41.20	48.90	0.00	3.49	47.1
P24D	2,4-DICHLOROPHENOXYACETIC ACID	ug/kg	3	352.90	352.90	1	1	100.0	51	38	74.5	352.90	93.20	0.00	6.50	82.3
PSILV	SILVEX	ug/kg	3	38.20	38.20	1	1	100.0	51	23	45.1	38.20	47.30	0.00	3.40	55.9
X2HCB	HEXACHLOROBENZENE	ug/kg	2	5.90	5.90	1	1	100.0	51	17	33.3	5.90	5.60	0.00	2.65	38.2

PLANT NAME : Wallaceburg
PLANT TYPE : Secondary

SAMPLING TYPE : Treated Sludge
SAMPLE FORM : Dry Weight

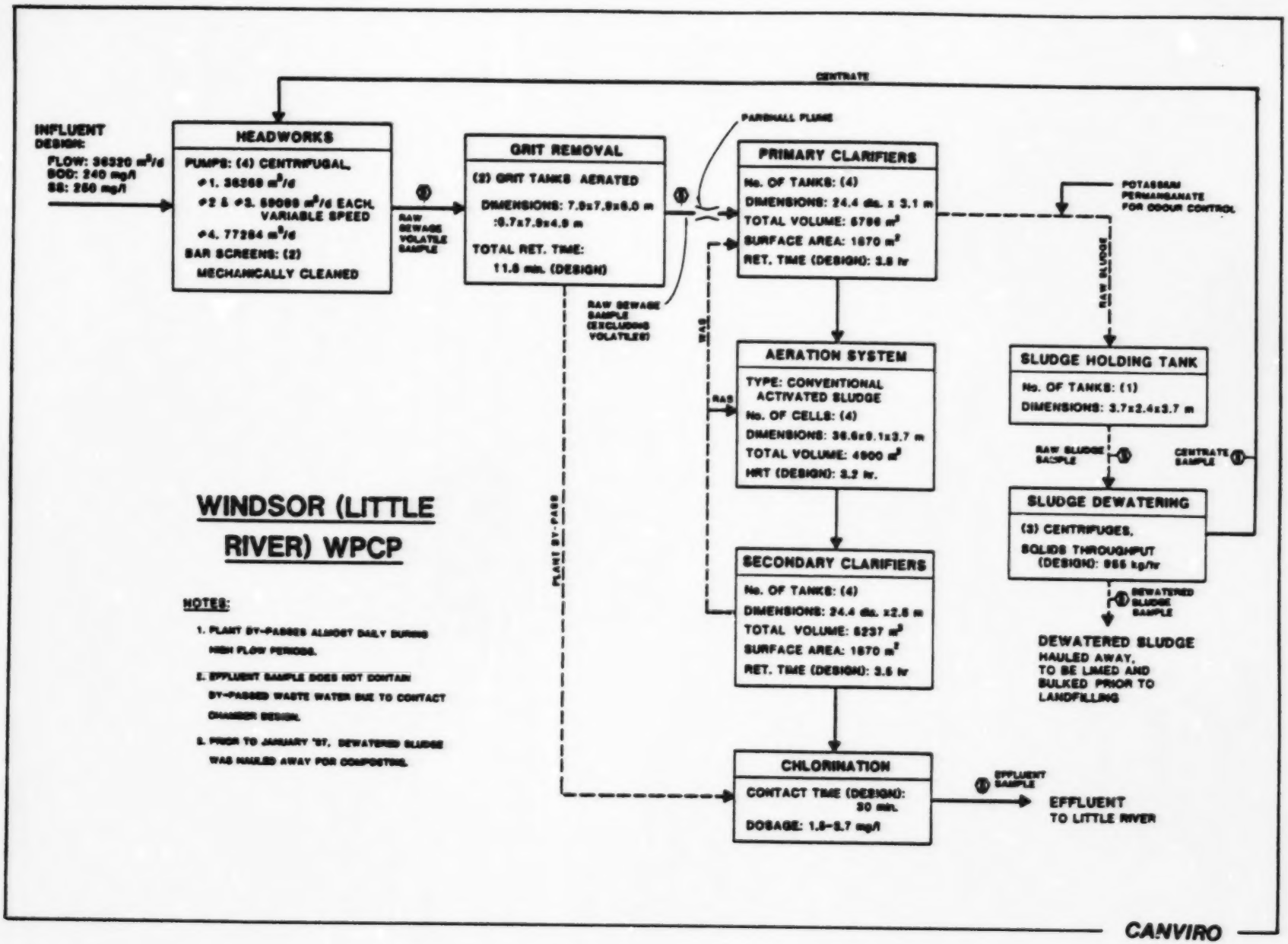
CONTAM-INANT	CONTAMINANT NAME	UNITS (DRY WEIGHT)	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
NNTKUR	NITROGEN-TOT-KJEL.,UNF.TOT	mg/kg	0	34500.00	34500.00	1	1	100.0	49	49	100.0	34500.00	38494.12	0.00	1.77	100.0
PH	(-LOG(H+(CONCN))	mg/kg	0	7.60	7.60	1	1	100.0	47	47	100.0	7.60	7.17	0.00	1.09	100.0
PHENOL	PHENOLICS (4AAP)	mg/kg	0	52.13	52.13	1	1	100.0	49	41	83.7	52.13	43.05	0.00	3.14	87.9
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/kg	0	26900.01	26900.01	1	1	100.0	43	43	100.0	26900.01	76638.67	0.00	6.91	100.0
RST	RESIDUE, TOTAL	mg/kg	0	211000.00	211000.00	1	1	100.0	50	50	100.0	211000.00	80434.04	0.00	3.23	100.0
RSTLOI	RESIDUE,TOT.LOSS ON IGNI.	mg/kg	0	97904.00	97904.00	1	1	100.0	50	50	100.0	97904.00	43379.33	0.00	3.19	100.0
METALS																
AGUT	SILVER,UNFILT.TOTAL	mg/kg	0	10.19	10.19	1	1	100.0	44	44	100.0	10.19	37.78	0.00	2.33	100.0
ALUT	ALUMINUM,UNFILT.TOTAL	mg/kg	0	9715.64	9715.64	1	1	100.0	50	50	100.0	9715.64	10715.94	0.00	2.82	100.0
ASUT	ARSENIC,UNFILT.TOTAL	mg/kg	0	9.72	9.72	1	1	100.0	50	49	98.0	9.72	5.40	0.00	2.06	97.1
COUT	COBALT,UNFILT.TOTAL	mg/kg	0	8.06	8.06	1	1	100.0	39	32	82.1	8.06	9.14	0.00	2.75	85.7
CRUT	CHROMIUM,UNFILT.TOTAL	mg/kg	0	7488.15	7488.15	1	1	100.0	50	50	100.0	7488.15	333.06	0.00	3.59	100.0
CUUT	COPPER,UNFILT.TOTAL	mg/kg	0	4962.09	4962.09	1	1	100.0	45	45	100.0	4962.09	732.24	0.00	2.16	100.0
HGUT	MERCURY,UNFILT.TOTAL	mg/kg	0	3.46	3.46	1	1	100.0	50	49	98.0	3.46	3.24	0.00	2.04	97.1
NIUT	NICKEL,UNFILT.TOTAL	mg/kg	0	2393.36	2393.36	1	1	100.0	45	42	93.3	2393.36	72.95	0.00	2.95	90.0
PBUT	LEAD,UNFILT.TOTAL	mg/kg	0	199.05	199.05	1	1	100.0	50	49	98.0	199.05	196.62	0.00	2.46	97.1
SEUT	SELENIUM,UNFILT.TOTAL	mg/kg	0	0.38	0.38	1	1	100.0	50	48	96.0	0.38	2.67	0.00	2.98	97.1
SRUT	STRONTIUM,UNFILT.TOTAL	mg/kg	0	208.53	208.53	1	1	100.0	50	50	100.0	208.53	240.93	0.00	2.54	100.0
ZNUT	ZINC,UNFILT.TOTAL	mg/kg	0	663.51	663.51	1	1	100.0	50	50	100.0	663.51	988.90	0.00	2.57	100.0
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
DIOXINS AND FURANS																
P8CDD	OCTACHLORODIBENZODIOXIN	ug/kg	1	4.50	4.50	1	1	100.0	49	26	53.1	4.50	7.10	0.00	3.84	64.7
VOLATILES ORGANIC COMPOUNDS																
X1CHLO	CHLOROFORM (CHCL3)	ug/kg	1	7.60	7.60	1	1	100.0	50	12	24.0	7.60	441.70	0.00	4.33	35.3

Sub-Appendix A-35

Windsor (Little River) WPCP

Contents:

- Plant Schematic with Design Characteristics
- Annual Data Review (1981 - 1986 Plant Performance)
- Sources of Municipal Water Pollution Control Plant Raw Sewage
- Operational Evaluation for Windsor (Little River) WPCP
- Analytical Data


CENTRATE
INFLUENT
DESIGN:
FLOW: 36320 m³/d
BOD: 240 mg/l
SS: 250 mg/l
HEADWORKS
PUMPS: (4) CENTRIFUGAL,
ø1. 36268 m³/d
ø2 & ø3. 59088 m³/d EACH, VARIABLE SPEED
ø4. 77284 m³/d
BAR SCREENS: (2)
MECHANICALLY CLEANED
RAW SEWAGE VOLATILE SAMPLE
GRIT REMOVAL
(2) GRIT TANKS AERATED
DIMENSIONS: 7.9x7.9x6.0 m
:6.7x7.9x4.9 m
TOTAL RET. TIME:
11.8 min. (DESIGN)
RAW SEWAGE SAMPLE (EXCLUDING VOLATILES)
PARSHALL FLUME
PRIMARY CLARIFIERS
No. OF TANKS: (4)
DIMENSIONS: 24.4 dia. x 3.1 m
TOTAL VOLUME: 5796 m³
SURFACE AREA: 1870 m²
RET. TIME (DESIGN): 3.8 hr
POTASSIUM PERMANGANATE FOR ODOUR CONTROL
RAW SLUDGE
WAS
RAS
AERATION SYSTEM
TYPE: CONVENTIONAL ACTIVATED SLUDGE
No. OF CELLS: (4)
DIMENSIONS: 36.6x9.1x3.7 m
TOTAL VOLUME: 4900 m³
HRT (DESIGN): 3.2 hr.
SLUDGE HOLDING TANK
No. OF TANKS: (1)
DIMENSIONS: 3.7x2.4x3.7 m
RAW SLUDGE SAMPLE
CENTRATE SAMPLE
SLUDGE DEWATERING
(3) CENTRIFUGES,
SOLIDS THROUGHPUT (DESIGN): 985 kg/hr
DEWATERED SLUDGE SAMPLE
DEWATERED SLUDGE
HAULED AWAY, TO BE LIMED AND BULKED PRIOR TO LANDFILLING
PLANT BY-PASS
SECONDARY CLARIFIERS
No. OF TANKS: (4)
DIMENSIONS: 24.4 dia. x2.8 m
TOTAL VOLUME: 5237 m³
SURFACE AREA: 1870 m²
RET. TIME (DESIGN): 3.6 hr
CHLORINATION
CONTACT TIME (DESIGN): 30 min.
DOSAGE: 1.5-5.7 mg/l
EFFLUENT SAMPLE
EFFLUENT
TO LITTLE RIVER
WINDSOR (LITTLE RIVER) WPCP
NOTES:
1. PLANT BY-PASSES ALMOST DAILY DURING HIGH FLOW PERIODS.
2. EFFLUENT SAMPLE DOES NOT CONTAIN BY-PASSED WASTE WATER DUE TO CONTACT CHAMBER DESIGN.
3. PRIOR TO JANUARY '87, DEWATERED SLUDGE WAS HAULED AWAY FOR COMPOSTING.
CANVIRO

LITTLE R. WPCP
Conventional Activated Sludge
Phosphorus Reaoval - Continuous
Capacity - 36.368 10(3)m3/day

PARAMETER	1981	1982	1983	1984	1985	MEAN ANNUAL AVERAGE
Avg. Daily Flow (1000 m3/day)	30.91	30.82	32.28	31.61	45.02	34.13
BOD5 - Influent (mg/L)	98.90	115.10	87.00	114.58	98.00	102.72
BOD5 - Effluent (mg/L)	3.60	3.40	3.00	4.75	5.33	4.02
Annual BOD5 Significantly Different from Mean Annual Average BOD5?	I.D.	I.D.	I.D.	I.D.	I.D.	
TSS - Influent (mg/L)	146.60	175.40	98.00	140.42	130.67	138.22
TSS - Effluent (mg/L)	6.60	6.80	8.00	9.92	9.50	8.16
Annual TSS Significantly Different from Mean Annual Average TSS?	I.D.	I.D.	I.D.	I.D.	I.D.	
Total P - Influent (mg/L)	6.00	5.90	4.40	5.56	4.87	5.35
Total P - Effluent (mg/L)	0.39	0.41	0.43	1.22	0.83	0.65
Annual TP Significantly Different from Mean Annual Average TP?	I.D.	I.D.	I.D.	I.D.	I.D.	
TP in Compliance?	Y	Y	Y	N	Y	Y

I.D. - Insufficient Data

R

SOURCES OF MUNICIPAL WATER POLLUTION CONTROL PLANT RAW SEWAGE

GENERAL DESCRIPTION OF WATER POLLUTION CONTROL PLANT (WPCP)

NAME OF WPCP	WINDSOR LITTLE RIVER WPCP
WORKS NUMBER	110000374
TREATMENT TYPE	CONVENTIONAL ACTIVATED SLUDGE PHOSPHORUS REMOVAL CONTINUOUS
DESIGN CAPACITY (1000 m3/d)	36.368
1986 AVERAGE DAY FLOW (1000 m3/d)	43.790
POPULATION SERVED	64000

% OF TOTAL FLOW ATTRIBUTED TO:

INDUSTRIAL SOURCES (%)	24
COMMERCIAL SOURCES (%) (Population x 0.0757)	11
RESIDENTIAL SOURCES (%) (Population x 0.175)	26
UNACCOUNTED FOR, INCL. INFILTRATION (100-% Contributed from industrial, commercial and residential sources)	39

PROFILE OF INDUSTRIES IN CATCHMENT

TOTAL NO OF INDUSTRIES	150
INDUSTRIES WITH WATER	42
NO OF SIC CATEGORIES	23

DESCRIPTION OF THE TOP 5 INDUSTRIES DISCHARGED TO THE WPCP (BASED ON WATER USE DATA)

DESCRIPTION	SIC	# OF COMPANIES
INSTRUMENTS AND RELATED PRODUCTS	3811-3873	3
TRANSPORTATION EQ'T	3711-3799	5
METAL FINISHING	3411-3469	9
MISC. ELECTRICAL EQ'T	3693-3699	1
MACHINERY MFG	3500-3599	

OPERATIONAL EVALUATION FOR: WINDSOR (LITTLE RIVER) WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: Feb. 20, 1987
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: 36,320 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
RAW SEWAGE FLOW	43,500	40,800	36,300	35,400	35,800	39,000	41,700
% of Design Flow	119.77%	112.33%	99.94%	97.47%	98.57%	107.38%	114.81%
Influent BOD (mg/L)	171.0	210.0	164.0	149.0	113.0	124.0	140.0
Primary BOD (mg/L)							
Secondary BOD (mg/L)	8.0	5.0	5.0	11.0	4.0	3.0	3.0
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	95.3	97.6	97.0	92.6	96.5	97.6	97.9
Influent SS (mg/L)	244.0	290.0	192.0	192.0	151.0	150.0	182.0
Primary SS (mg/L)							
Secondary SS (mg/L)	11.0	7.0	8.0	13.0	11.0	7.0	8.0
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	95.5	97.6	95.8	93.2	92.7	95.3	95.6
NH3 { Influent NH4 (mg/L)	14.2	12.8					5.4
NH3 { Primary NH4 (mg/L)							
NH3 { Secondary NH4 (mg/L)	1.0	0.6					1.3
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	93.2	95.3					75.9
Influent TKN (mg/L)	25.3	23.2					14.0
Primary TKN (mg/L)							
Secondary TKN (mg/L)	2.4	2.4					1.3
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	90.5	89.7					90.7
Influent Total P (mg/L)	6.90	6.20	4.60	5.10	4.60	4.00	3.70
Primary Total P (mg/L)							
Secondary Total P (mg/L)	0.50	0.19	0.34	0.42	0.46	0.30	0.32
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	92.8	96.9	92.6	91.8	90.0	92.5	91.4

Note: 1. Overflow occurred on Feb. 3,6,7,8.
2. Chemical feed pumps were NOT operational on Feb 15-19.
3. Vandals broke into plant/adjusted air valves & gates thus upsetting the biological process.

OPERATIONAL EVALUATION FOR: WINDSOR (LITTLE RIVER) WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: Feb. 20, 1987
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: 36,320 m3/d

	PARAMETER	PRE-SAMPLING PERIOD DAY 8	DAY 9	DAY 10	DAY 11	DAY 12	DAY 13	DAY 14
	RAW SEWAGE FLOW	34,000	34,900	34,000	34,000	41,700	31,300	27,600
	% of Design Flow	93.61%	96.09%	93.61%	93.61%	114.81%	86.18%	75.99%
	Influent BOD (mg/L)	145.0	148.0	107.0	172.0	226.0	230.0	145.0
	Primary BOD (mg/L)							
	Secondary BOD (mg/L)	7.0	6.0	4.0	3.0	5.0	4.0	21.0
	% PRIMARY REMOVAL							
	% SECONDARY REMOVAL	95.2	95.9	96.3	98.3	97.8	98.3	85.5
	Influent SS (mg/L)	171.0	174.0	128.0	172.0	228.0	216.0	214.0
	Primary SS (mg/L)							
	Secondary SS (mg/L)	16.0	12.0	11.0	8.0	14.0	7.0	16.0
	% PRIMARY REMOVAL							
	% SECONDARY REMOVAL	90.6	93.1	91.4	95.3	93.9	96.8	92.5
NH3	Influent NH4 (mg/L)	6.8	6.8					
NH3	Primary NH4 (mg/L)							
NH3	Secondary NH4 (mg/L)	0.8	1.4					
	% PRIMARY REMOVAL							
	% SECONDARY REMOVAL	88.4	79.4					
	Influent TKN (mg/L)	11.7	12.2					
	Primary TKN (mg/L)							
	Secondary TKN (mg/L)	2.6	1.7					
	% PRIMARY REMOVAL							
	% SECONDARY REMOVAL	77.8	86.1					
	Influent Total P (mg/L)	4.60	5.00	4.30	5.50	8.00	8.50	5.10
	Primary Total P (mg/L)							
	Secondary Total P (mg/L)	1.50	0.38	0.46	0.34	0.64	0.51	1.10
	% PRIMARY REMOVAL							
	% SECONDARY REMOVAL	67.4	92.4	89.3	93.8	92.0	94.0	78.4

Note: 1. Overflow occurred on Feb. 3,6,7,8.
2. Chemical feed pumps were NOT operational on Feb 15-19.
3. Vandals broke into plant/adjusted air valves & gates thus upsetting the biological process.

OPERATIONAL EVALUATION FOR: WINDSOR (LITTLE RIVER) WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: Feb. 20, 1987
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: 36,320 m3/d

	PARAMETER	SAMPLING PERIOD DAY 15	DAY 16	DAY 17	DAY 18	DAY 19	DAY 20	DAY 21
	RAW SEWAGE FLOW	27,600	28,100	28,100	29,500	29,000		
	% of Design Flow	75.99%	77.37%	77.37%	81.22%	79.85%		
	Influent BOD (mg/L)	173.0	159.0	125.0	219.0	107.0		
	Primary BOD (mg/L)							
	Secondary BOD (mg/L)	27.0	27.0	27.0	3.0	28.0		
	% PRIMARY REMOVAL							
	% SECONDARY REMOVAL	84.4	83.0	78.4	98.6	73.8		
	Influent SS (mg/L)	135.0	140.0	124.0	217.0	106.0		
	Primary SS (mg/L)							
	Secondary SS (mg/L)	6.0	8.0	9.0	16.0	9.0		
	% PRIMARY REMOVAL							
	% SECONDARY REMOVAL	95.6	94.3	92.7	92.6	91.5		
NH3	Influent NH4 (mg/L)	15.7	18.5					
NH3	Primary NH4 (mg/L)							
NH3	Secondary NH4 (mg/L)	2.7	2.0					
	% PRIMARY REMOVAL							
	% SECONDARY REMOVAL	82.8	89.2					
	Influent TKN (mg/L)	27.6	32.6					
	Primary TKN (mg/L)							
	Secondary TKN (mg/L)	9.0	14.3					
	% PRIMARY REMOVAL							
	% SECONDARY REMOVAL	67.4	56.1					
	Influent Total P (mg/L)	7.40	6.20	5.20	7.20	6.40		
	Primary Total P (mg/L)							
	Secondary Total P (mg/L)	0.80	0.99	0.37	0.35	0.45		
	% PRIMARY REMOVAL							
	% SECONDARY REMOVAL	89.2	84.0	92.9	95.1	93.0		

Note: 1. Overflow occurred on Feb. 3,6,7,8.
2. Chemical feed pumps were NOT operational on Feb 15-19.
3. Vandals broke into plant/adjusted air valves & gates thus upsetting the biological process.

PLANT NAME : Windsor (Little River)
PLANT TYPE : Secondary

SAMPLING TYPE : Raw Sewage
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0	111.00	265.00	5	5	100.0	267	266	99.6	156.59	140.23	1.52	1.93	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0	232.00	328.00	5	5	100.0	260	258	99.2	281.81	287.75	1.14	1.82	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0	20.10	36.50	5	5	100.0	271	271	100.0	25.55	22.39	1.26	1.81	100.0
NNHTPR	AMMONIUM,TOTAL FILT.REAC.	mg/L	0	18.80	19.20	5	5	100.0	275	274	99.6	19.00	15.37	1.01	1.69	100.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0	26.30	28.60	5	5	100.0	273	273	100.0	27.31	25.44	1.03	1.47	100.0
PH	(-LOG(H+(CONCN))		0	6.69	6.90	5	5	100.0	275	275	100.0	6.79	6.90	1.01	1.05	100.0
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/L	0	5.20	5.80	6	6	100.0	248	248	100.0	5.55	5.18	1.05	1.51	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0	93.00	125.00	5	5	100.0	267	266	99.6	106.50	126.88	1.11	1.93	100.0
METALS																
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	990.00	2200.00	6	6	100.0	322	306	95.0	1400.00	1000.10	1.42	2.65	97.3
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	30.00	120.00	6	6	100.0	322	237	73.6	70.00	51.10	1.58	3.44	89.2
CUUT	COPPER,UNFILT.TOTAL	ug/L	0	50.00	50.00	1	1	100.0	49	48	98.0	50.00	110.60	0.00	2.28	97.1
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	0.08	0.28	5	5	100.0	283	274	96.8	0.16	0.23	1.60	2.11	100.0
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	630.00	740.00	6	6	100.0	319	318	99.7	680.00	370.70	1.07	2.14	100.0
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	130.00	340.00	6	6	100.0	322	315	97.8	200.00	211.00	1.38	2.94	100.0
COUT	COBALT,UNFILT.TOTAL	ug/L	0	20.00	30.00	6	4	66.7	322	82	25.5	20.00	9.30	2.11	2.31	83.8
MOUT	MOLYBDENUM,UNFILT.TOTAL	ug/L	0	70.00	70.00	6	2	33.3	321	41	12.8	20.00	12.40	2.73	1.72	56.8
NIUT	NICKEL,UNFILT.TOTAL	ug/L	0	50.00	70.00	6	2	33.3	322	103	32.0	30.00	38.80	1.56	2.70	54.1
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PMMCRE	M-CRESOL	ug/L	1	19.00	28.20	5	5	100.0	275	167	60.7	24.48	25.59	1.17	3.45	86.5
PMPHEN	PHENOL	ug/L	2	18.80	22.90	5	3	60.0	275	118	42.9	13.56	14.52	1.73	2.46	78.4
PMNITB	NITROBENZENE	ug/L	1	28.70	28.70	5	1	20.0	275	1	0.4	7.09	5.03	2.18	1.29	2.7
PESTICIDES,HERBICIDES,PCBS																
P1BHCG	GAMMA-BHC(HEXACHLORCYCLOHEXANE)	ug/L	2	0.03	0.07	5	5	100.0	276	143	51.8	0.05	0.02	1.40	2.29	94.6
P24D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	0.27	0.37	5	4	80.0	276	214	77.5	0.12	0.13	3.25	3.72	100.0
P1ALDR	ALDRIN	ug/L	1	0.04	0.04	5	1	20.0	276	3	1.1	0.01	0.01	1.86	1.21	8.1
P1HEPT	HEPTACHLOR	ug/L	3	0.08	0.08	5	1	20.0	276	10	3.6	0.02	0.01	2.53	1.48	18.9
P245T	2,4,5-TRICLORPHENOXYACETIC ACID	ug/L	3	0.14	0.14	5	1	20.0	276	22	8.0	0.06	0.06	1.58	1.60	37.5
X2124	1,2,4-TRICHLOROBENZENE	ug/L	3	0.06	0.06	5	1	20.0	276	35	12.7	0.01	0.01	2.23	2.48	40.5

PLANT NAME : Windsor (Little River)
PLANT TYPE : Secondary

SAMPLING TYPE : Final Effluent
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	STD. FOR SURFACE WATER	STD. REF.	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET.	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																		
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0		-	18.60	44.00	5	5	100.0	213	211	99.1	32.61	21.22	1.43	2.07	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0		-	56.00	118.00	4	4	100.0	213	211	99.1	78.95	52.80	1.37	1.83	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0		-	5.50	7.70	5	5	100.0	220	220	100.0	6.51	8.09	1.18	1.60	100.0
NNHTFR	AMMONIUM,TOTAL FILT.REAC.	mg/L	0		-	0.25	5.75	5	5	100.0	223	204	91.5	1.56	3.90	3.48	6.98	100.0
NNO2FR	NITRITE,FILT. REACT.	mg/L	0		-	0.51	1.60	5	5	100.0	220	194	88.2	0.96	0.22	1.57	5.95	96.4
NNOTFR	NITRATES,TOTAL FILT.REAC.	mg/L	0		-	8.00	14.10	5	5	100.0	224	186	83.0	11.01	2.33	1.33	7.75	96.4
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0		-	1.60	8.00	5	5	100.0	222	222	100.0	3.72	7.97	1.91	2.71	100.0
PH	(-LOG(H+(CONC))		0		-	6.50	6.93	5	5	100.0	224	224	100.0	6.65	7.10	1.03	1.05	100.0
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/L	0		-	0.28	0.91	6	6	100.0	211	206	97.6	0.54	0.68	1.54	1.97	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0		-	4.90	8.00	5	5	100.0	220	219	99.5	6.76	10.12	1.24	2.00	100.0
METALS																		
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	75.00	ONT-MOE	200.00	720.00	6	6	100.0	264	196	74.2	440.00	101.70	1.68	3.72	96.4
CUUT	COPPER,UNFILT.TOTAL	ug/L	0	5.00	ONT-MOE	20.00	20.00	1	1	100.0	47	30	63.8	20.00	13.10	0.00	2.56	77.8
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	0.20	ONT-MOE	0.01	0.02	5	5	100.0	233	220	94.4	0.01	0.03	1.46	2.62	100.0
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	3750.00	ONT-MOE	600.00	780.00	6	6	100.0	267	267	100.0	670.00	340.90	1.10	2.14	100.0
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	30.00	ONT-MOE	60.00	120.00	6	6	100.0	267	262	98.1	80.00	53.30	1.34	2.48	100.0
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	100.00	ONT-MOE	10.00	10.00	6	5	83.3	267	137	51.3	10.00	9.00	1.36	2.00	89.3
NIUT	NICKEL,UNFILT.TOTAL	ug/L	0	25.00	ONT-MOE	10.00	60.00	6	5	83.3	267	171	64.0	20.00	22.10	2.67	3.60	85.7
MOUT	MOLYBDENUM,UNFILT.TOTAL	ug/L	0		-	10.00	20.00	6	3	50.0	267	75	28.1	10.00	6.60	1.76	1.56	67.9
CDUT	CADMIUM,UNFILT.TOTAL	ug/L	0	0.20	ONT-MOE	0.00	0.00	6	1	16.7	267	65	24.3	0.00	2.10	1.33	2.07	71.4
COUT	COBALT,UNFILT.TOTAL	ug/L	0	5.00	NYS-STD	10.00	10.00	6	1	16.7	266	65	24.4	10.00	6.40	1.33	1.54	82.1
PBUT	LEAD,UNFILT.TOTAL	ug/L	0	25.00	ONT-MOE	90.00	90.00	6	1	16.7	267	25	9.4	20.00	16.50	2.09	1.48	60.7
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																		
PNONITB	NITROBENZENE	ug/L	1	10.00	ONT-MOE	4.50	4.50	5	1	20.0	228	4	1.8	1.35	1.09	1.96	1.54	14.3
DIOXINS AND FURANS																		
P8CDF	OCTACHLORODIBENZOFURAN	ug/L	1	150.00	ONT-MOE	0.50	0.50	1	1	100.0	44	2	4.6	0.50	0.28	0.00	2.90	7.1
PESTICIDES,HERBICIDES,PCBS																		
P24D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	4.00	ONT-MOE	0.05	0.17	5	5	100.0	227	177	78.0	0.10	0.08	1.59	4.71	100.0
P1BHCG	GAMMA-BHC(HEXCHLORCYCLHEXANE)	ug/L	2	0.06	ONT-MOE	0.03	0.04	5	4	80.0	227	157	69.2	0.02	0.02	2.48	2.48	96.4
P245T	2,4,5-TRICLORPHENOXYACETIC ACID	ug/L	3		-	0.12	0.12	5	1	20.0	227	25	11.0	0.03	0.03	2.02	2.27	42.9
VOLATILES ORGANIC COMPOUNDS																		
X1111T	1,1,1-TRICHLOROETHANE	ug/L	1	50.00	NYS-GUL	2.10	2.10	4	1	25.0	224	18	8.0	1.20	1.18	1.45	1.86	28.6
X111CE	1,1-DICHLOROETHANE	ug/L	1	50.00	NYS-GUL	2.20	2.20	4	1	25.0	224	3	1.3	1.22	1.01	1.48	1.10	10.7
X113DR	TRANS-1,3-DICHLOROPROPENE	ug/L	1	50.00	NYS-GUL	2.40	2.40	4	1	25.0	224	1	0.5	1.24	1.00	1.55	1.06	3.6
X1BDCM	BROMODICHLOROMETHANE	ug/L	1	50.00	NYS-GUL	3.10	3.10	4	1	25.0	224	7	3.1	1.80	1.55	1.44	1.20	17.9
X1CDBM	CHLORODIBROMOMETHANE	ug/L	1	50.00	NYS-GUL	2.50	2.50	4	1	25.0	224	4	1.8	1.26	1.02	1.58	1.13	7.1

PLANT NAME : Windsor (Little River)
PLANT TYPE : Secondary

SAMPLING TYPE : Final Effluent
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	STD. FOR SURFACE WATER	STD. REF.	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET.	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
VOLATILES ORGANIC COMPOUNDS																		
X1CDCE	CIS-1,2-DICHLOROETHYLENE	ug/L	1	0.07	NYS-GUL	2.20	2.20	4	1	25.0	224	2	0.9	1.22	1.01	1.48	1.11	7.1
X1CHLO	CHLOROFORM	ug/L	1	0.20	NYS-STD	8.20	8.20	4	1	25.0	224	37	16.5	1.69	1.37	2.86	2.18	64.3
X1TRIC	TRICHLOROETHYLENE	ug/L	1	3.00	NYS-GUL	2.00	2.00	4	1	25.0	224	17	7.6	1.19	1.12	1.41	1.55	21.4
X2CBEN	CHLOROBENZENE	ug/L	1	15.00	ONT-MOE	2.10	2.10	4	1	25.0	224	1	0.5	1.20	1.00	1.45	1.05	3.6

PLANT NAME : Windsor (Little River)
PLANT TYPE : Secondary

SAMPLING TYPE : Recycle
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0	1500.00	3000.00	3	3	100.0	20	20	100.0	2114.19	905.21	1.41	2.32	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0	1910.00	3230.00	3	3	100.0	39	39	100.0	2615.44	3439.26	1.32	4.55	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0	55.50	824.00	3	3	100.0	42	42	100.0	296.50	77.62	4.32	3.54	100.0
NNHTPR	AMMONIUM,TOTAL FILT.REAC.	mg/L	0	127.00	203.00	3	3	100.0	44	44	100.0	156.61	146.20	1.27	2.07	100.0
NNOTPR	NITRATES,TOTAL FILT.REAC.	mg/L	0	0.25	0.70	3	3	100.0	44	39	88.6	0.46	0.41	1.71	2.66	100.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0	143.00	260.00	3	3	100.0	42	42	100.0	194.86	324.28	1.35	1.95	100.0
PH	(-LOG(H+(CONCN))		0	6.48	6.64	3	3	100.0	44	44	100.0	6.56	6.94	1.01	1.05	100.0
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/L	0	8.50	13.11	4	4	100.0	43	43	100.0	11.02	53.83	1.20	4.47	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0	348.00	411.00	3	3	100.0	42	42	100.0	388.19	2242.77	1.10	3.60	100.0
NNO2PR	NITRITE,FILT. REACT.	mg/L	0	0.06	0.06	3	2	66.7	42	36	85.7	0.03	0.05	3.24	3.13	100.0
METALS																
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	4700.00	10000.00	4	4	100.0	53	53	100.0	7620.00	28798.20	1.40	4.42	100.0
CAUT	CALCIUM,UNFILT.TOTAL	ug/L	0	110000.00	145000.00	4	4	100.0	54	54	100.0	121500.00	208447.60	1.13	1.87	100.0
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	30.00	90.00	4	4	100.0	53	51	96.2	50.00	874.70	1.62	6.11	100.0
CUUT	COPPER,UNFILT.TOTAL	ug/L	0	60.00	60.00	1	1	100.0	12	12	100.0	60.00	1814.00	0.00	5.64	100.0
FEUT	IRON,UNFILT.TOTAL	ug/L	0	12000.00	22000.00	4	4	100.0	53	53	100.0	16760.00	109943.30	1.29	4.19	100.0
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	0.18	0.30	3	3	100.0	47	44	93.6	0.23	1.68	1.29	4.49	100.0
MGUT	MAGNESIUM,UNFILT.TOTAL	ug/L	0	35000.00	48000.00	4	4	100.0	54	54	100.0	39150.00	41620.20	1.15	1.78	100.0
NIUT	NICKEL,UNFILT.TOTAL	ug/L	0	130.00	170.00	4	4	100.0	53	41	77.4	150.00	308.60	1.12	3.08	88.9
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	1200.00	1600.00	4	4	100.0	53	53	100.0	1410.00	1347.00	1.13	2.13	100.0
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	150.00	230.00	4	4	100.0	53	53	100.0	180.00	3112.40	1.21	7.41	100.0
AGUT	SILVER,UNFILT.TOTAL	ug/L	0	10.00	10.00	4	2	50.0	53	42	79.3	10.00	72.30	2.66	4.09	100.0
CCNPUR	CYANIDE-PREB,UNFILT.REAC.	ug/L	0	10.00	10.00	3	1	33.3	43	17	39.5	0.00	4.00	2.08	5.19	66.7
COUT	COBALT,UNFILT.TOTAL	ug/L	0	20.00	20.00	4	1	25.0	53	21	39.6	10.00	23.60	1.94	4.63	88.9
MOUT	MOLYBDENUM,UNFILT.TOTAL	ug/L	0	60.00	60.00	4	1	25.0	54	18	33.3	20.00	35.60	2.45	4.15	77.8
PBUT	LEAD,UNFILT.TOTAL	ug/L	0	100.00	100.00	4	1	25.0	53	36	67.9	50.00	429.50	1.64	6.62	100.0
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PM4CRE	M-CRESOL	ug/L	1	2800.00	9900.00	3	3	100.0	43	27	62.8	5705.44	562.69	1.91	5.65	88.9
PMPHEN	PHENOL	ug/L	2	281.50	480.80	3	2	66.7	43	5	11.6	272.80	124.37	1.79	2.60	33.3
DIOXINS AND FURANS																
P5CDF	PENTACHLORODIBENZOFURAN	ng/L	1	1.00	1.00	1	1	100.0	11	1	9.1	1.00	0.71	0.00	4.86	11.1
P6CDF	HEXACHLORODIBENZOFURAN	ng/L	1	3.00	3.00	1	1	100.0	11	1	9.1	3.00	1.11	0.00	3.88	11.1
P7CDF	HEPTACHLORODIBENZOFURAN	ng/L	1	20.00	20.00	1	1	100.0	11	1	9.1	20.00	1.09	0.00	5.12	11.1
P8CDF	OCTACHLORODIBENZOFURAN	ng/L	1	7.00	7.00	1	1	100.0	11	1	9.1	7.00	0.94	0.00	4.05	11.1
PESTICIDES,HERBICIDES,PCBS																
P24D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	0.78	2.60	3	3	100.0	44	29	65.9	1.25	0.79	1.90	5.21	88.9
P5SILV	SILVEX	ug/L	3	0.14	0.19	3	3	100.0	44	15	34.1	0.17	0.38	1.17	5.08	66.7
P1BHCG	GAMMA-BHC(HEXCHLORCYCLHEXANE)	ug/L	2	0.06	0.08	3	2	66.7	44	17	38.6	0.04	0.08	3.09	2.57	66.7
P24ST	2,4,5-TRICLORPHENOXYACETIC ACID	ug/L	3	0.59	0.63	3	2	66.7	44	18	40.9	0.26	0.43	4.24	4.50	77.8
P1BHCB	BETA-BHC (HEXCHLORCYCLHEXANE)	ug/L	1	0.04	0.04	3	1	33.3	44	10	22.7	0.02	0.08	2.23	2.84	55.6

PLANT NAME : Windsor (Little River)
PLANT TYPE : Secondary

SAMPLING TYPE : Recycle
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	PL MIN. >	VT CONC. DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
PESTICIDES,HERBICIDES,PCBS																	
P1HEPE	HEPTACHLOREPOXIDE	ug/L	2	0.08		0.08	3	1	33.3	44	3	6.8	0.04	0.06	3.56	3.11	33.3
VOLATILES ORGANIC COMPOUNDS																	
X1DCLE	1,1-DICHLOROETHENE	ug/L	1	120.00		140.00	3	2	66.7	44	3	6.8	69.52	21.38	2.95	2.00	22.2

PLANT NAME : Windsor (Little River)
PLANT TYPE : Secondary

SAMPLING TYPE : Raw Sludge
SAMPLE FORM : Dry Weight

CONTAM-INANT	CONTAMINANT NAME	UNITSQA/QC (DRY WEIGHT)	CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
COD	CHEMICAL OXYGEN DEMAND	mg/kg	0	1181818.18	1181818.18	1	1	100.0	45	45	100.0	1181818.18	892221.45	0.00	3.19	100.0
NNHTPR	AMMONIUM,TOTAL FIL.T.REAC.	mg/kg	0	15135.14	15135.14	1	1	100.0	48	47	97.9	15135.14	5911.32	0.00	4.59	100.0
NNOTPR	NITRATES,TOTAL FIL.T.REAC.	mg/kg	0	38.08	38.08	1	1	100.0	48	43	89.6	38.08	25.44	0.00	2.21	93.9
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/kg	0	47911.55	47911.55	1	1	100.0	51	51	100.0	47911.55	36897.85	0.00	2.98	100.0
PH	(-LOG(H+(CONCN))	mg/kg	0	5.80	5.80	1	1	100.0	49	49	100.0	5.80	6.03	0.00	1.10	100.0
PPUT	PHOSPHORUS,UNFIL.T.TOTAL	mg/kg	0	29975.43	29975.43	1	1	100.0	42	42	100.0	29975.43	20347.70	0.00	4.43	100.0
RST	RESIDUE, TOTAL	mg/kg	0	40700.00	40700.00	1	1	100.0	51	51	100.0	40700.00	32783.51	0.00	1.81	100.0
RSTLOI	RESIDUE,TOT.LOSS ON IGNI.	mg/kg	0	27100.00	27100.00	1	1	100.0	51	51	100.0	27100.00	20803.05	0.00	1.77	100.0
METALS																
AGUT	SILVER,UNFIL.T.TOTAL.	mg/kg	0	32.19	32.19	1	1	100.0	45	40	88.9	32.19	30.17	0.00	2.61	84.4
ALUT	ALUMINUM,UNFIL.T.TOTAL.	mg/kg	0	39895.33	39895.33	1	1	100.0	51	51	100.0	39895.33	9835.74	0.00	2.51	100.0
ASUT	ARSENIC,UNFIL.T.TOTAL.	mg/kg	0	3.44	3.44	1	1	100.0	51	50	98.0	3.44	6.13	0.00	2.01	97.1
CDUT	CADMIUM,UNFIL.T.TOTAL.	mg/kg	0	3.44	3.44	1	1	100.0	43	40	93.0	3.44	9.74	0.00	4.35	90.0
CRUT	CHROMIUM,UNFIL.T.TOTAL.	mg/kg	0	296.31	296.31	1	1	100.0	51	50	98.0	296.31	301.43	0.00	3.68	97.1
CUUT	COPPER,UNFIL.T.TOTAL.	mg/kg	0	275.68	275.68	1	1	100.0	46	46	100.0	275.68	606.31	0.00	1.72	100.0
HGUT	MERCURY,UNFIL.T.TOTAL.	mg/kg	0	0.98	0.98	1	1	100.0	50	50	100.0	0.98	2.23	0.00	1.67	100.0
NIUT	NICKEL,UNFIL.T.TOTAL.	mg/kg	0	112.53	112.53	1	1	100.0	46	44	95.7	112.53	59.17	0.00	2.90	93.3
PBUT	LEAD,UNFIL.T.TOTAL.	mg/kg	0	74.20	74.20	1	1	100.0	49	48	98.0	74.20	173.99	0.00	2.24	96.9
SEUT	SELENIUM,UNFIL.T.TOTAL.	mg/kg	0	2.95	2.95	1	1	100.0	50	48	96.0	2.95	3.04	0.00	1.93	93.9
SRUT	STRONTIUM,UNFIL.T.TOTAL.	mg/kg	0	436.12	436.12	1	1	100.0	51	51	100.0	436.12	231.70	0.00	1.97	100.0
ZNUT	ZINC,UNFIL.T.TOTAL.	mg/kg	0	748.16	748.16	1	1	100.0	51	51	100.0	748.16	905.39	0.00	2.39	100.0
PESTICIDES,HERBICIDES,PCBS																
P1BHCB	BETA-BHC (HEXCHLORCYCLOHEXANE)	ug/kg	1	36.90	36.90	1	1	100.0	51	18	35.3	36.90	7.40	0.00	3.29	38.2
P1BHCG	GAMMA-BHC(HEXCHLORCYCLOHEXANE)	ug/kg	2	29.50	29.50	1	1	100.0	51	28	54.9	29.50	8.90	0.00	2.69	67.7
P1CHLA	ALPHA-CHLORDANE	ug/kg	1	7.40	7.40	1	1	100.0	51	18	35.3	7.40	5.90	0.00	2.38	47.1
P1CHLG	GAMMA-CHLORDANE	ug/kg	1	9.80	9.80	1	1	100.0	51	19	37.3	9.80	6.00	0.00	2.44	50.0
P1DIEL	DIELDRIN	ug/kg	2	14.70	14.70	1	1	100.0	51	20	39.2	14.70	7.20	0.00	3.10	50.0
P1DMDT	METHOXYCHLOR	ug/kg	1	24.60	24.60	1	1	100.0	51	19	37.3	24.60	45.80	0.00	5.15	44.1
P1PCBT	PCB, TOTAL.	ug/kg	2	56.50	56.50	1	1	100.0	51	40	78.4	56.50	88.70	0.00	3.18	79.4
P245T	2,4,5-TRICLORPHENOXYACETIC ACID	ug/kg	3	184.30	184.30	1	1	100.0	51	21	41.2	184.30	48.90	0.00	3.49	47.1
P24D	2,4-DICHLOROPHENOXYACETIC ACID	ug/kg	3	761.70	761.70	1	1	100.0	51	38	74.5	761.70	93.20	0.00	6.50	82.3
P5SILV	SILVEX	ug/kg	3	63.90	63.90	1	1	100.0	51	23	45.1	63.90	47.30	0.00	3.40	55.9
X1HCCP	HEXACHLOROCYCLOPENTADIENE	ug/kg	3	44.20	44.20	1	1	100.0	51	2	3.9	44.20	35.30	0.00	2.18	5.9
X2124	1,2,4-TRICHLOROBENZENE	ug/kg	3	29.50	29.50	1	1	100.0	51	17	33.3	29.50	9.30	0.00	4.06	41.2
VOLATILE ORGANIC COMPOUNDS																
B2EBNZ	ETHYLBENZENE (C8H10)	ug/kg	1	1228.50	1228.50	1	1	100.0	51	10	19.6	1228.50	890.70	0.00	2.60	26.5
B2MPXY	M-, AND P-XYLENES	ug/kg	1	2702.70	2702.70	1	1	100.0	51	16	31.4	2702.70	1345.90	0.00	3.86	41.2
B2OXYL	O-XYLENE (C8H10)	ug/kg	1	1474.20	1474.20	1	1	100.0	51	8	15.7	1474.20	841.60	0.00	2.51	23.5
X1CHLO	CHLOROFORM (CHCL3)	ug/kg	1	19656.00	19656.00	1	1	100.0	51	12	23.5	19656.00	1225.10	0.00	4.24	35.3

PLANT NAME : Windsor (Little River)
PLANT TYPE : Secondary

SAMPLING TYPE : Treated Sludge
SAMPLE FORM : Dry Weight

CONTAMINANT	CONTAMINANT NAME	UNITS (DRY WEIGHT)	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
COD	CHEMICAL OXYGEN DEMAND	mg/kg	0	1104938.27	1104938.27	1	1	100.0	36	36	100.0	1104938.27	508097.94	0.00	4.65	100.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/kg	0	24200.00	24200.00	1	1	100.0	49	49	100.0	24200.00	38494.12	0.00	1.77	100.0
PH	(-LOG(H+(CONCN))	mg/kg	0	7.30	7.30	1	1	100.0	47	47	100.0	7.30	7.17	0.00	1.09	100.0
PHNOL	PHENOLICS (4AAP)	mg/kg	0	23.46	23.46	1	1	100.0	49	41	83.7	23.46	43.05	0.00	3.14	87.9
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/kg	0	5580160.00	5580160.00	1	1	100.0	43	43	100.0	5580160.00	76638.67	0.00	6.91	100.0
RST	RESIDUE, TOTAL	mg/kg	0	162000.00	162000.00	1	1	100.0	50	50	100.0	162000.00	80434.04	0.00	3.23	100.0
RSTLOI	RESIDUE,TOT.LOSS ON IGNI.	mg/kg	0	108378.00	108378.00	1	1	100.0	50	50	100.0	108378.00	43379.33	0.00	3.19	100.0
METALS																
ALUT	ALUMINUM,UNFILT.TOTAL	mg/kg	0	50663.09	50663.09	1	1	100.0	50	50	100.0	50663.09	10715.94	0.00	2.82	100.0
ASUT	ARSENIC,UNFILT.TOTAL	mg/kg	0	4.69	4.69	1	1	100.0	50	49	98.0	4.69	5.40	0.00	2.06	97.1
CDUT	CADMIUM,UNFILT.TOTAL	mg/kg	0	3.02	3.02	1	1	100.0	45	41	91.1	3.02	10.47	0.00	3.98	90.3
CRUT	CHROMIUM,UNFILT.TOTAL	mg/kg	0	382.41	382.41	1	1	100.0	50	50	100.0	382.41	333.06	0.00	3.59	100.0
CUUT	COPPER,UNFILT.TOTAL	mg/kg	0	443.46	443.46	1	1	100.0	45	45	100.0	443.46	732.24	0.00	2.16	100.0
HGUT	MERCURY,UNFILT.TOTAL	mg/kg	0	1.85	1.85	1	1	100.0	50	49	98.0	1.85	3.24	0.00	2.04	97.1
NIUT	NICKEL,UNFILT.TOTAL	mg/kg	0	99.38	99.38	1	1	100.0	45	42	93.3	99.38	72.95	0.00	2.95	90.0
PBUT	LEAD,UNFILT.TOTAL	mg/kg	0	78.09	78.09	1	1	100.0	50	49	98.0	78.09	196.62	0.00	2.46	97.1
SEUT	SELENIUM,UNFILT.TOTAL	mg/kg	0	3.83	3.83	1	1	100.0	50	48	96.0	3.83	2.67	0.00	2.98	97.1
SRUT	STRONTIUM,UNFILT.TOTAL	mg/kg	0	486.11	486.11	1	1	100.0	50	50	100.0	486.11	240.93	0.00	2.54	100.0
ZNUT	ZINC,UNFILT.TOTAL	mg/kg	0	809.20	809.20	1	1	100.0	50	50	100.0	809.20	988.90	0.00	2.57	100.0
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PMOMCRE	M-CRESOL	ug/kg	1	86419.80	86419.80	1	1	100.0	50	15	30.0	86419.80	5281.80	0.00	8.20	35.3
DIOXINS AND FURANS																
P98CDD	OCTACHLORODIBENZODIOXIN	ug/kg	1	0.60	0.60	1	1	100.0	49	26	53.1	0.60	7.10	0.00	3.84	64.7
PESTICIDES,HERBICIDES,PCBS																
P1ALDR	ALDRIN	ug/kg	1	13.10	13.10	1	1	100.0	50	11	22.0	13.10	5.30	0.00	2.67	26.5
P1BHCB	BETA-BHC (HEXCHLORCYCLOHEXANE)	ug/kg	1	93.20	93.20	1	1	100.0	50	19	38.0	93.20	8.80	0.00	4.39	47.1
P1BHCG	GAMMA-BHC(HEXCHLORCYCLOHEXANE)	ug/kg	2	52.80	52.80	1	1	100.0	50	12	24.0	52.80	5.70	0.00	3.13	35.3
P1CHLA	ALPHA-CHLORDANE	ug/kg	1	14.70	14.70	1	1	100.0	50	22	44.0	14.70	6.50	0.00	2.41	55.9
P1CHLG	GAMMA-CHLORDANE	ug/kg	1	22.00	22.00	1	1	100.0	50	21	42.0	22.00	6.80	0.00	2.58	52.9
P1DIEL	DIELDRIN	ug/kg	2	63.10	63.10	1	1	100.0	50	15	30.0	63.10	6.50	0.00	3.51	38.2
P1DMDT	METHOXYCHLOR	ug/kg	1	114.90	114.90	1	1	100.0	50	15	30.0	114.90	34.10	0.00	4.42	38.2
P1END2	ENDOSULFAN II	ug/kg	3	33.70	33.70	1	1	100.0	50	7	14.0	33.70	4.70	0.00	2.67	20.6
P1ENDR	ENDRIN	ug/kg	3	28.20	28.20	1	1	100.0	50	5	10.0	28.20	4.20	0.00	2.36	14.7
P1ENDS	ENDOSULFAN SULPHATE	ug/kg	3	54.80	54.80	1	1	100.0	50	6	12.0	54.80	17.50	0.00	2.53	17.7
P1PDD	PP-DDD	ug/kg	1	30.40	30.40	1	1	100.0	50	7	14.0	30.40	4.60	0.00	2.47	20.6
P24D	2,4-DICHLOROPHENOXYACETIC ACID	ug/kg	3	260.50	260.50	1	1	100.0	50	25	50.0	260.50	75.00	0.00	5.81	64.7
X11CCP	HEXACHLOROCYCLOPENTADIENE	ug/kg	3	435.40	435.40	1	1	100.0	50	8	16.0	435.40	34.20	0.00	2.76	23.5
X2124	1,2,4-TRICHLOROBENZENE	ug/kg	3	44.80	44.80	1	1	100.0	50	22	44.0	44.80	14.80	0.00	5.02	52.9
VOLATILES ORGANIC COMPOUNDS																

PLANT NAME : Windsor (Little River) **SAMPLING TYPE : Treated Sludge**
PLANT TYPE : Secondary **SAMPLE FORM : Dry Weight**

CONTAM-INANT	CONTAMINANT NAME	UNITS (DRY WEIGHT)	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
VOLATILE ORGANIC COMPOUNDS																
B2EBNZ	ETHYLBENZENE (C8H10)	ug/kg	1	3888.90	3888.90	1	1	100.0	50	14	28.0	3888.90	606.50	0.00	5.59	32.4
B2MPXY	M-, AND P-XYLENES	ug/kg	1	13580.20	13580.20	1	1	100.0	50	15	30.0	13580.20	816.00	0.00	7.11	32.4
B2OXYL	O-XYLENE (C8H10)	ug/kg	1	3765.40	3765.40	1	1	100.0	50	14	28.0	3765.40	523.50	0.00	4.05	32.4
X1CHLO	CHLOROFORM (CHCL3)	ug/kg	1	1234.60	1234.60	1	1	100.0	50	12	24.0	1234.60	441.70	0.00	4.33	35.3
X1TETR	TETRACHLOROETHYLENE	ug/kg	1	2839.50	2839.50	1	1	100.0	50	2	4.0	2839.50	285.40	0.00	3.51	5.9

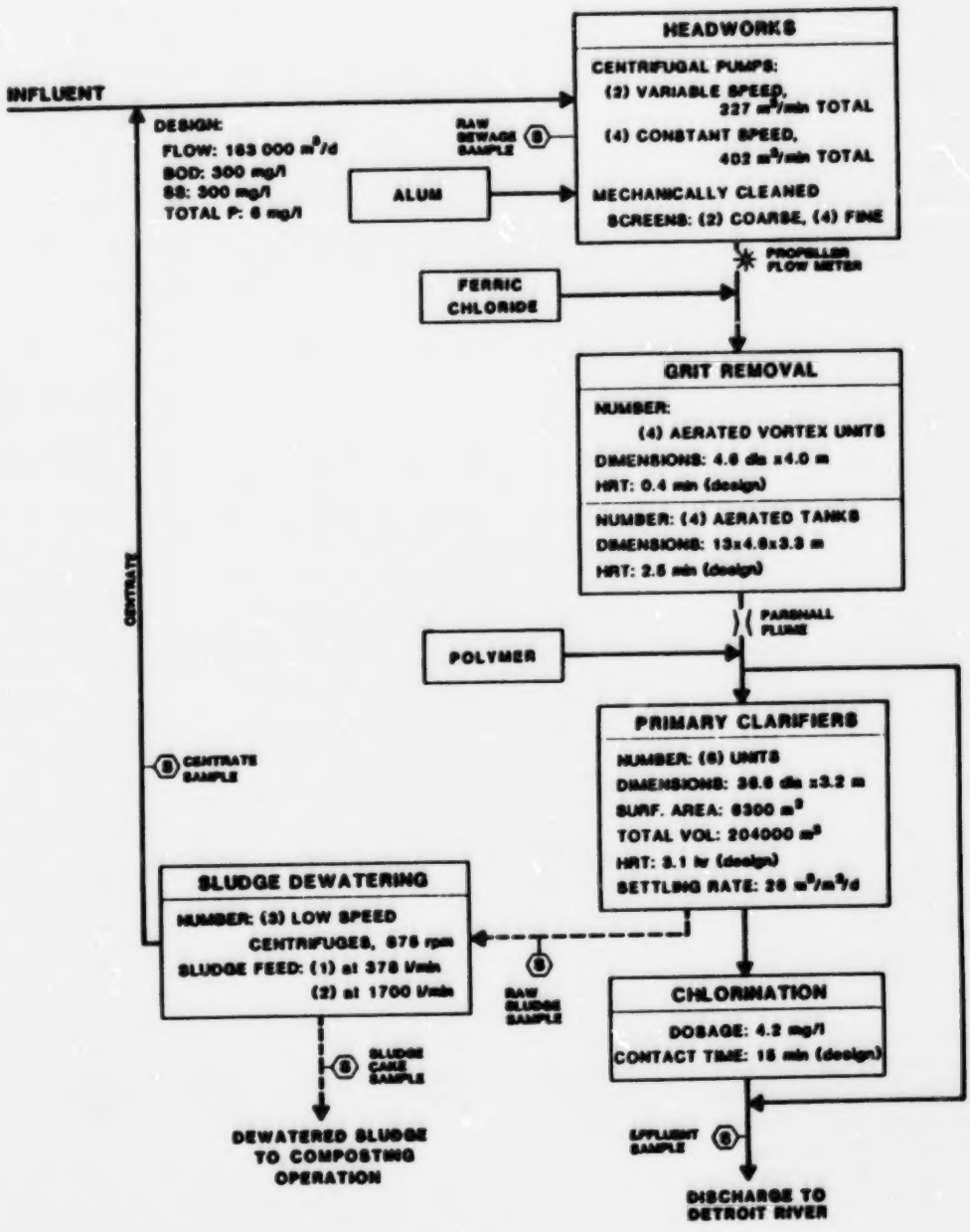
Sub-Appendix A-36

Windsor (Westerly) WPCP

Contents:

- Plant Schematic with Design Characteristics
- Annual Data Review (1981 - 1986 Plant Performance)
- Sources of Municipal Water Pollution Control Plant Raw Sewage
- Operational Evaluation for Windsor (Westerly) WPCP
- Analytical Data

(KIR18/28A)



NOTES:

1. High proportion of combined sewers cause periodic hydraulic overloads.
2. Influent wastewater constituent concentrations are highly variable.
3. Seasonal chlorination (May 1 to Oct 31)

WINDSOR (WEST) WPCP

CANVIRO

WESTERLY WPCP
Primary
Phosphorus Removal - Continuous
Capacity - 163.656 10(3)m3/day

PARAMETER	1981	1982	1983	1984	1985	MEAN ANNUAL AVERAGE
Avg. Daily Flow (1000 m3/day)	184.10	185.47	185.81	188.56	124.68	187.97
BOD5 - Influent (mg/L)	200.60	72.00	79.00	93.67	71.92	103.44
BOD5 - Effluent (mg/L)	28.00	26.00	25.00	24.50	22.17	25.31
Annual BOD5 Significantly Different from Mean Annual Average BOD5?	I.D.	I.D.	I.D.	I.D.	I.D.	
TSS - Influent (mg/L)	127.00	91.00	111.00	124.00	80.17	106.41
TSS - Effluent (mg/L)	24.00	21.60	24.00	20.50	20.00	22.04
Annual TSS Significantly Different from Mean Annual Average TSS?	I.D.	I.D.	I.D.	I.D.	I.D.	
Total P - Influent (mg/L)	4.60	3.00	4.00	5.15	4.40	4.41
Total P - Effluent (mg/L)	0.92	0.79	0.89	0.73	0.86	0.84
Annual TP Significantly Different from Mean Annual Average TP?	I.D.	I.D.	I.D.	I.D.	I.D.	
TP in Compliance?	Y	Y	Y	Y	Y	Y

I.D. - Insufficient Data

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SOURCES OF MUNICIPAL WATER POLLUTION CONTROL PLANT RAW SEWAGE

GENERAL DESCRIPTION OF WATER POLLUTION CONTROL PLANT (WPCP)

NAME OF WPCP	WINDSOR WESTERLY WPCP
WORKS NUMBER	120001103
TREATMENT TYPE	PRIMARY PHOSPHORUS REMOVAL CONTINUOUS
DESIGN CAPACITY (1000 m3/d)	163.656
1986 AVERAGE DAY FLOW (1000 m3/d)	126.434
POPULATION SERVED	123000

% OF TOTAL FLOW ATTRIBUTED TO:

INDUSTRIAL SOURCES (%)	28
COMMERCIAL SOURCES (%) (Population x 0.0757)	7
RESIDENTIAL SOURCES (%) (Population x 0.175)	17
UNACCOUNTED FOR, INCL. INFILTRATION (100-% Contributed from industrial, commercial and residential sources)	48

PROFILE OF INDUSTRIES IN CATCHMENT

TOTAL NO OF INDUSTRIES	345
INDUSTRIES WITH WATER	249
NO OF SIC CATEGORIES	36

DESCRIPTION OF THE TOP 5 INDUSTRIES DISCHARGED TO THE WPCP (BASED ON WATER USE DATA)

DESCRIPTION	SIC	# OF COMPANIES
TRANSPORTATION EQ'T	3711-3799	18
METAL FINISHING	3411-3469	39
FATS AND OILS	2074-2079	1
NON-FERROUS METALS FORMING MFG	3331-3369	2
MACHINERY MFG	3500-3599	99

R

OPERATIONAL EVALUATION FOR: WINDSOR (WESTERLY) WPCP

TREATMENT FACILITY: Primary
PERIOD ENDING: Feb. 20, 1987
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: 163,600 m3/d

PARAMETER	PRE-SAMPLING PERIOD						
	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
RAW SEWAGE FLOW	120,000	123,000	124,000	109,000	118,000	109,000	115,000
% of Design Flow	73.35%	75.18%	75.79%	66.63%	72.13%	66.63%	70.29%
Influent BOD (mg/L)	59.0	153.0	103.0	89.0	82.0	67.0	74.0
Primary BOD (mg/L)							
Secondary BOD (mg/L)	31.0	40.0	34.0	44.0	39.0	18.0	29.0
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	47.5	73.9	67.0	50.6	52.4	73.1	60.8
Influent SS (mg/L)	58.0	158.0	123.0	92.0	126.0	80.0	94.0
Primary SS (mg/L)							
Secondary SS (mg/L)	20.0	29.0	16.0	23.0	23.0	18.0	24.0
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	65.5	81.6	87.0	75.0	81.7	77.5	74.5
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)	3.40	3.40	3.40	3.10	3.40	3.40	2.60
Primary Total P (mg/L)							
Secondary Total P (mg/L)	0.92	1.00	0.67	0.65	0.84	0.36	0.60
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	72.9	70.6	80.3	79.0	75.3	89.4	76.9

OPERATIONAL EVALUATION FOR: WINDSOR (WESTERLY) WPCP

TREATMENT FACILITY: Primary
PERIOD ENDING: Feb. 20, 1987
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: 163,600 m3/d

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 8	DAY 9	DAY 10	DAY 11	DAY 12	DAY 13	DAY 14
RAW SEWAGE FLOW	115,000	100,000	114,000	106,000	101,000	81,000	72,000
% of Design Flow	70.29%	61.12%	69.68%	64.79%	61.74%	49.51%	44.01%
Influent BOD (mg/L)	140.0	141.0	109.0	78.0	105.0	84.0	74.0
Primary BOD (mg/L)							
Secondary BOD (mg/L)	20.0	40.0	42.0	25.0	30.0	21.0	21.0
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	85.7	71.6	61.5	67.9	71.4	75.0	71.6
Influent SS (mg/L)	112.0	164.0	122.0	53.0	122.0	103.0	94.0
Primary SS (mg/L)							
Secondary SS (mg/L)	16.0	59.0	36.0	37.0	21.0	32.0	23.0
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	85.7	64.0	70.5	30.2	82.8	68.9	75.5
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)	2.40	3.70	3.40	2.30	3.40	5.00	6.00
Primary Total P (mg/L)							
Secondary Total P (mg/L)	0.60	1.70	1.30	1.30	0.71	1.20	1.30
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	75.0	54.1	61.8	43.5	79.1	76.0	78.3

OPERATIONAL EVALUATION FOR: WINDSOR (WESTERLY) WPCP

TREATMENT FACILITY: Primary
PERIOD ENDING: Feb. 20, 1987
SAMPLING SEASON: Winter (Cold Weather)
DESIGN AVG FLOW: 163,600 m3/d

PARAMETER	SAMPLING PERIOD						
	DAY 15	DAY 16	DAY 17	DAY 18	DAY 19	DAY 20	DAY 21
RAW SEWAGE FLOW	85,000	82,000	84,000	83,000	88,000		
% of Design Flow	51.96%	50.12%	51.34%	50.73%	53.79%		
Influent BOD (mg/L)		114.0	108.0	142.0	113.0		
Primary BOD (mg/L)							
Secondary BOD (mg/L)	52.0	56.0	51.0	63.0	41.0		
% PRIMARY REMOVAL							
% SECONDARY REMOVAL		50.9	52.8	55.6	63.7		
Influent SS (mg/L)		142.0	136.0	138.0	139.0		
Primary SS (mg/L)							
Secondary SS (mg/L)	25.0	18.0	14.0	13.0	14.0		
% PRIMARY REMOVAL							
% SECONDARY REMOVAL		87.3	89.7	90.6	89.9		
Influent NH4 (mg/L)							
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent TKN (mg/L)							
Primary TKN (mg/L)							
Secondary TKN (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							
Influent Total P (mg/L)		4.80	5.00	5.20	4.70		
Primary Total P (mg/L)							
Secondary Total P (mg/L)	1.10	0.78	0.50	0.54	0.57		
% PRIMARY REMOVAL							
% SECONDARY REMOVAL		83.8	90.0	89.6	87.9		

PLANT NAME : Windsor (Westerly)
PLANT TYPE : Primary

SAMPLING TYPE : Raw Sewage
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0	88.90	210.00	5	5	100.0	267	266	99.6	115.56	140.23	1.41	1.93	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0	210.00	386.00	5	5	100.0	260	258	99.2	277.33	287.75	1.28	1.82	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0	14.30	21.50	5	5	100.0	271	271	100.0	18.32	22.39	1.17	1.81	100.0
NNHTPR	AMMONIUM,TOTAL PLT.REAC.	mg/L	0	10.60	12.20	5	5	100.0	275	274	99.6	11.44	15.37	1.06	1.69	100.0
NNTEUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0	17.50	22.50	5	5	100.0	273	273	100.0	19.83	25.44	1.10	1.47	100.0
PH	(-LOG(H+(CONCN))		0	6.76	6.89	5	5	100.0	275	275	100.0	6.81	6.90	1.01	1.05	100.0
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/L	0	4.45	8.65	6	6	100.0	248	248	100.0	5.50	5.18	1.29	1.51	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0	108.00	151.00	5	5	100.0	267	266	99.6	122.59	126.88	1.13	1.93	100.0
METALS																
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	6200.00	8000.00	6	6	100.0	322	306	95.0	6740.00	1000.10	1.09	2.65	97.3
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	50.00	160.00	6	6	100.0	322	237	73.6	100.00	51.10	1.53	3.44	89.2
CUUT	COPPER,UNFILT.TOTAL	ug/L	0	110.00	110.00	1	1	100.0	49	48	98.0	110.00	110.60	0.00	2.28	97.1
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	0.09	0.18	5	5	100.0	283	274	96.8	0.14	0.23	1.34	2.11	100.0
NIUT	NICKEL,UNFILT.TOTAL	ug/L	0	120.00	310.00	6	6	100.0	322	103	32.0	210.00	38.80	1.50	2.70	54.1
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	400.00	480.00	6	6	100.0	319	318	99.7	430.00	370.70	1.08	2.14	100.0
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	130.00	180.00	6	6	100.0	322	315	97.8	160.00	211.00	1.12	2.94	100.0
MOUT	MOLYBDENUM,UNFILT.TOTAL	ug/L	0	30.00	60.00	6	3	50.0	321	41	12.8	20.00	12.40	2.16	1.72	56.8
AGUT	SILVER,UNFILT.TOTAL	ug/L	0	20.00	20.00	6	2	33.3	321	82	25.6	10.00	10.40	2.68	2.55	75.7
CDUT	CADMIUM,UNFILT.TOTAL	ug/L	0	20.00	20.00	6	1	16.7	322	76	23.6	10.00	6.50	1.78	2.09	70.3
COUT	COBALT,UNFILT.TOTAL	ug/L	0	30.00	30.00	6	1	16.7	322	82	25.5	10.00	9.30	2.07	2.31	83.8
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PMECRE	M-CRESOL	ug/L	1	29.20	29.20	5	1	20.0	275	167	60.7	9.08	25.59	1.97	3.45	86.5
DIOXINS AND FURANS																
P8CDD	OCTACHLORODIBENZODIOXIN	ng/L	1	15.00	15.00	1	1	100.0	54	4	7.4	15.00	0.87	0.00	3.66	10.8
PESTICIDES,HERBICIDES,PCBS																
P24D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	0.05	0.52	5	5	100.0	276	214	77.5	0.19	0.13	2.58	3.72	100.0
P1BHCG	GAMMA-BHC(HEXCHLORCYCLHEXANE)	ug/L	2	0.03	0.06	5	4	80.0	276	143	51.8	0.03	0.02	2.03	2.29	94.6
P1BHCA	ALPHA-BHC(HEXCHLORCYCLHEXANE)	ug/L	1	0.02	0.08	5	2	40.0	276	16	5.8	0.02	0.01	2.47	1.58	18.9
P1ALDR	ALDRIN	ug/L	1	0.02	0.02	5	1	20.0	276	3	1.1	0.01	0.01	1.36	1.21	8.1
P1CHLO	GAMMA-CHLORDANE	ug/L	1	0.02	0.02	5	1	20.0	276	9	3.3	0.01	0.01	1.36	1.49	16.2
P1DIEL	DIELDRIN	ug/L	2	0.04	0.04	5	1	20.0	276	8	2.9	0.01	0.01	1.86	1.28	18.9
P1DMDT	METHOXYCHLOR	ug/L	1	0.10	0.10	5	1	20.0	276	47	17.0	0.06	0.08	1.36	3.14	43.2
P1END2	ENDOSULFAN II	ug/L	3	0.04	0.04	5	1	20.0	276	10	3.6	0.01	0.01	1.86	1.42	21.6
P1PCBT	PCB, TOTAL	ug/L	2	0.28	0.28	5	1	20.0	276	42	15.2	0.06	0.06	2.39	2.31	46.0
X2HCB	HEXACHLOROBENZENE	ug/L	2	0.10	0.10	5	1	20.0	276	11	4.0	0.02	0.01	2.80	1.39	18.9

PLANT NAME : Windsor (Westerly)
PLANT TYPE : Primary

SAMPLING TYPE : Raw Sewage
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
VOLATILES ORGANIC COMPOUNDS																
X1TRIC	TRICHLOROETHYLENE	ug/L	1	160.00	690.00	5	5	100.0	274	15	5.5	282.52	23.59	1.77	1.82	16.2
B2MPXY	M-, AND P-XYLENES	ug/L	1	48.00	180.00	5	2	40.0	274	43	15.7	36.98	26.08	2.62	2.02	37.8
B2OXYL	O-XYLENE	ug/L	1	50.00	83.00	5	2	40.0	274	25	9.1	31.93	22.47	1.93	1.56	24.3

PLANT NAME : Windsor (Westerly)
PLANT TYPE : Primary

SAMPLING TYPE : Final Effluent
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	STD. FOR SURFACE WATER	STD. REF.	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET.	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																		
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0		-	28.40	58.00	5	5	100.0	40	40	100.0	45.28	48.40	1.33	2.05	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0		-	86.00	124.00	5	5	100.0	40	40	100.0	104.14	108.54	1.17	1.56	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0		-	14.20	17.00	5	5	100.0	40	40	100.0	15.63	12.80	1.09	1.40	100.0
NNHTFR	AMMONIUM,TOTAL FILT.REAC.	mg/L	0		-	11.60	12.20	5	5	100.0	40	40	100.0	11.86	10.46	1.03	1.66	100.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0		-	14.40	15.60	5	5	100.0	40	40	100.0	14.85	15.36	1.03	1.30	100.0
PH	(-LOG(H+(CONCN))		0		-	6.76	6.98	5	5	100.0	40	40	100.0	6.85	6.88	1.01	1.03	100.0
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/L	0		-	0.33	1.07	6	6	100.0	34	34	100.0	0.58	1.34	1.51	1.96	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0		-	16.70	29.80	5	5	100.0	39	39	100.0	22.13	29.57	1.29	1.73	100.0
METALS																		
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	75.00	ONT-MOE	1100.00	1480.00	6	6	100.0	48	46	95.8	1270.00	550.00	1.10	3.45	100.0
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	100.00	ONT-MOE	20.00	40.00	6	6	100.0	48	29	60.4	30.00	10.80	1.36	1.94	85.7
CUUT	COPPER,UNFILT.TOTAL	ug/L	0	5.00	ONT-MOE	10.00	10.00	1	1	100.0	8	7	87.5	10.00	10.20	0.00	1.85	100.0
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	**0.20**	ONT-MOE	0.01	0.01	5	5	100.0	39	38	97.4	0.01	0.05	1.00	2.42	100.0
NIUT	NICKEL,UNFILT.TOTAL	ug/L	0	25.00	ONT-MOE	10.00	140.00	6	6	100.0	48	10	20.8	70.00	8.70	2.50	2.86	57.1
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	3750.00	ONT-MOE	360.00	490.00	6	6	100.0	48	47	97.9	410.00	304.90	1.11	2.83	100.0
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	30.00	ONT-MOE	60.00	90.00	6	6	100.0	48	48	100.0	70.00	69.80	1.18	3.04	100.0
MOUT	MOLYBDENUM,UNFILT.TOTAL	ug/L	0		-	10.00	20.00	6	4	66.7	48	11	22.9	10.00	6.60	1.97	1.66	71.4
CDUT	CADMIUM,UNFILT.TOTAL	ug/L	0	0.20	ONT-MOE	0.00	0.00	6	1	16.7	48	18	37.5	0.00	2.50	1.49	1.96	85.7
COUT	COBALT,UNFILT.TOTAL	ug/L	0	5.00	NYS-STD	10.00	10.00	6	1	16.7	48	11	22.9	10.00	6.50	1.33	1.58	85.7
PBUT	LEAD,UNFILT.TOTAL	ug/L	0	25.00	ONT-MOE	40.00	40.00	6	1	16.7	48	9	18.8	20.00	20.80	1.49	1.94	71.4
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																		
PMOCRE	O-CRESOL	ug/L	2		-	3.80	7.20	5	2	40.0	39	2	5.1	2.47	1.60	2.06	1.33	14.3
PMBBP	BUTYLBENZYLPHTHALATE	ug/L	1	50.00	NYS-GUL	3.30	3.30	5	1	20.0	39	8	20.5	1.27	1.42	1.71	2.10	57.1
PMMCRE	M-CRESOL	ug/L	1		-	8.80	8.80	5	1	20.0	39	18	46.2	2.14	3.90	2.21	2.97	71.4
PNNAPH	NAPHTHALENE	ug/L	1	10.00	NYS-STD	2.10	2.10	5	1	20.0	39	5	12.8	1.16	1.13	1.39	1.42	42.9
DIOXINS AND FURANS																		
PHCDD	OCTACHLORODIBENZODIOXIN	ng/L	1	150.00	ONT-MOE	0.08	0.08	1	1	100.0	8	2	25.0	0.08	0.25	0.00	3.33	28.6
PESTICIDES,HERBICIDES,PCBS																		
P1BHCG	GAMMA-BHC(HEXCHLORCYCLHEXANE)	ug/L	2	0.06	ONT-MOE	0.02	0.04	5	5	100.0	40	29	72.5	0.03	0.02	1.35	2.28	85.7
P1DMDT	METHOXYCHLOR	ug/L	1	0.04	ONT-MOE	0.80	0.80	5	1	20.0	40	4	10.0	0.05	0.04	4.71	3.12	28.6
P524D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	4.00	ONT-MOE	0.04	0.04	5	1	20.0	40	27	67.5	0.01	0.06	1.86	4.96	85.7
VOLATILES ORGANIC COMPOUNDS																		
B2MPXY	M-, AND P-XYLENES	ug/L	1	50.00	NYS-GUL	11.00	83.00	5	5	100.0	38	10	26.3	32.22	1.83	2.43	3.42	85.7
B2OXYL	O-XYLENE	ug/L	1	100.00	ONT-MOE	11.00	39.00	5	5	100.0	38	13	34.2	23.53	1.94	1.76	3.05	85.7
X1TETR	TETRACHLOROETHYLENE	ug/L	1	0.70	NYS-GUL	20.00	380.00	5	5	100.0	38	21	55.3	101.06	4.39	2.87	5.84	85.7
X1TRIC	TRICHLOROETHYLENE	ug/L	1	3.00	NYS-GUL	6.40	420.00	5	5	100.0	38	7	18.4	17.74	1.71	5.91	3.60	42.9

PLANT NAME : Windsor (Westerly)
PLANT TYPE : Primary

SAMPLING TYPE : Final Effluent
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	STD. FOR SURFACE WATER	STD. REF.	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET.	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
VOLATILES ORGANIC COMPOUNDS																		
B2EBNZ	ETHYLBENZENE	ug/L	1	70.00	ONT-MOE	6.80	17.00	5	4	80.0	38	5	13.2	5.92	1.29	2.88	2.03	28.6
X1BDCM	BROMODICHLOROMETHANE	ug/L	1	50.00	NYS-GUL	3.30	3.30	5	1	20.0	38	1	2.6	1.76	1.52	1.42	1.16	14.3
X1CHLO	CHLOROFORM	ug/L	1	0.20	NYS-STD	5.30	5.30	5	1	20.0	38	15	39.5	1.40	2.07	2.11	2.72	71.4

PLANT NAME : Windsor (Westerly)
PLANT TYPE : Primary

SAMPLING TYPE : Recycle
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	PLANT MIN. CONC. > MDL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0	780.00	3600.00	4	4	100.0	20	20	100.0	1963.19	905.21	1.92	2.32	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0	2770.00	5260.00	4	4	100.0	39	39	100.0	3778.35	3439.26	1.30	4.55	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0	693.00	861.00	4	4	100.0	42	42	100.0	789.73	77.62	1.10	3.54	100.0
NNHTFR	AMMONIUM,TOTAL FILT.REAC.	mg/L	0	109.00	130.00	4	4	100.0	44	44	100.0	123.20	146.20	1.09	2.07	100.0
NNO2FR	NITRITE,FILT. REACT.	mg/L	0	0.11	0.24	4	4	100.0	42	36	85.7	0.16	0.05	1.37	3.13	100.0
NNOTFR	NITRATES,TOTAL FILT.REAC.	mg/L	0	0.75	1.00	4	4	100.0	44	39	88.6	0.88	0.41	1.13	2.66	100.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0	133.00	155.00	4	4	100.0	42	42	100.0	146.25	324.28	1.07	1.95	100.0
PH	(-LOG(H+(CONCN))		0	6.44	6.59	4	4	100.0	44	44	100.0	6.51	6.94	1.01	1.05	100.0
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/L	0	7.25	15.32	5	5	100.0	43	43	100.0	9.78	53.83	1.36	4.47	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0	447.00	656.00	4	4	100.0	42	42	100.0	507.57	2242.77	1.20	3.60	100.0
METALS																
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	5900.00	24000.00	5	5	100.0	53	53	100.0	10380.00	28798.20	1.71	4.42	100.0
CAUT	CALCIUM,UNFILT.TOTAL	ug/L	0	150000.00	190000.00	5	5	100.0	54	54	100.0	173410.00	208447.60	1.11	1.87	100.0
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	50.00	860.00	5	5	100.0	53	51	96.2	120.00	874.70	3.27	6.11	100.0
CUUT	COPPER,UNFILT.TOTAL	ug/L	0	190.00	190.00	1	1	100.0	12	12	100.0	190.00	1814.00	0.00	5.64	100.0
FEUT	IRON,UNFILT.TOTAL	ug/L	0	107840.00	400000.00	5	5	100.0	53	53	100.0	233810.00	109943.30	1.61	4.19	100.0
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	0.22	0.41	4	4	100.0	47	44	93.6	0.29	1.68	1.30	4.49	100.0
MGUT	MAGNESIUM,UNFILT.TOTAL	ug/L	0	37780.00	48000.00	5	5	100.0	54	54	100.0	42740.00	41620.20	1.12	1.78	100.0
NIUT	NICKEL,UNFILT.TOTAL	ug/L	0	510.00	750.00	5	5	100.0	53	41	77.4	640.00	308.60	1.17	3.08	88.9
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	1400.00	1700.00	5	5	100.0	53	53	100.0	1590.00	1347.00	1.08	2.13	100.0
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	130.00	570.00	5	5	100.0	53	53	100.0	220.00	3112.40	1.82	7.41	100.0
COUT	COBALT,UNFILT.TOTAL	ug/L	0	20.00	300.00	5	2	40.0	53	21	39.6	20.00	23.60	5.93	4.63	88.9
MOUT	MOLYBDENUM,UNFILT.TOTAL	ug/L	0	40.00	50.00	5	2	40.0	54	18	33.3	20.00	35.60	2.28	4.15	77.8
PBUT	LEAD,UNFILT.TOTAL	ug/L	0	100.00	240.00	5	2	40.0	53	36	67.9	80.00	429.50	2.00	6.62	100.0
AGUT	SILVER,UNFILT.TOTAL	ug/L	0	20.00	20.00	5	1	20.0	53	42	79.3	10.00	72.30	2.89	4.09	100.0
BEUT	BERYLLIUM,UNFILT.TOTAL	ug/L	0	60.00	60.00	5	1	20.0	53	2	3.8	10.00	5.90	2.93	1.65	22.2
CDUT	CADMIUM,UNFILT.TOTAL	ug/L	0	20.00	20.00	5	1	20.0	53	37	69.8	10.00	58.40	1.86	6.63	77.8
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PM4CRE	M-CRESOL	ug/L	1	3300.00	13900.00	4	4	100.0	43	27	62.8	8391.48	562.69	1.90	5.65	88.9
DIOXINS AND FURANS																
P8CDD	OCTACHLORODIBENZODIOXIN	ng/L	1	2.50	2.50	1	1	100.0	11	3	27.3	2.50	1.87	0.00	4.46	33.3
PESTICIDES,HERBICIDES,PCBS																
P1BHCG	GAMMA-BHC(HEXCHLORCYCLHEXANE)	ug/L	2	0.04	0.50	4	4	100.0	44	17	38.6	0.16	0.08	3.86	2.57	66.7
P24D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	0.61	1.90	4	3	75.0	44	29	65.9	0.36	0.79	7.35	5.21	88.9
P1BHCB	BETA-BHC (HEXCHLORCYCLHEXANE)	ug/L	1	0.18	0.30	4	2	50.0	44	10	22.7	0.09	0.08	4.49	2.84	55.6
P1BHCA	ALPHA-BHC(HEXCHLORCYCLHEXANE)	ug/L	1	0.05	0.05	4	1	25.0	44	7	15.9	0.05	0.06	2.96	2.50	33.3
P1DMDT	METHOXYCHLOR	ug/L	1	0.30	0.30	4	1	25.0	44	7	15.9	0.25	0.32	2.98	2.82	44.4
P1PCBT	PCB, TOTAL	ug/L	2	0.16	0.16	4	1	25.0	44	27	61.4	0.06	0.77	2.00	7.58	77.8
P1PPDD	PP-DDD	ug/L	1	0.02	0.02	4	1	25.0	44	10	22.7	0.04	0.05	3.20	2.86	66.7
P245T	2,4,5-TRICLORPHENOXYACETIC ACID	ug/L	3	0.17	0.17	4	1	25.0	44	18	40.9	0.07	0.43	1.84	4.50	77.8

PLANT NAME : Windsor (Westerly)
PLANT TYPE : Primary

SAMPLING TYPE : Recycle
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	PLANT MIN. CONC. > MDL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
PESTICIDES,HERBICIDES,PCBS																
X1HCCP	HEXACHLOROCYCLOPENTADIENE	ug/L	3	2.20	2.20	4	1	25.0	44	6	13.6	0.39	0.48	4.90	3.21	44.4
X2HCB	HEXACHLOROBENZENE	ug/L	2	0.09	0.09	4	1	25.0	44	12	27.3	0.05	0.07	3.11	4.31	66.7
VOLATILES ORGANIC COMPOUNDS																
B2MPXY	M-, AND P-XYLENES	ug/L	1	55.00	61.00	4	2	50.0	44	2	4.6	34.04	19.61	1.85	1.67	11.1
B2OXYL	O-XYLENE	ug/L	1	41.00	45.00	4	2	50.0	44	2	4.6	29.31	19.34	1.56	1.62	11.1
X1TRIC	TRICHLOROETHYLENE	ug/L	1	53.00	57.00	4	2	50.0	44	2	4.6	33.16	19.56	1.79	1.66	11.1
X1DCLE	1,1-DICHLOROETHENE	ug/L	1	180.00	180.00	4	1	25.0	44	3	6.8	34.64	21.38	3.00	2.00	22.2

PLANT NAME : Windsor (Westerly) **SAMPLING TYPE : Raw Sludge**
PLANT TYPE : Primary **SAMPLE FORM : Dry Weight**

CONTAM-INANT	CONTAMINANT NAME	UNITS (DRY WEIGHT)	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
NNHTFR	AMMONIUM,TOTAL FILT.REAC.	mg/kg	0	4870.77	4870.77	1	1	100.0	48	47	97.9	4870.77	5911.32	0.00	4.59	100.0
NNOTFR	NITRATES,TOTAL FILT.REAC.	mg/kg	0	39.22	39.22	1	1	100.0	48	43	89.6	39.22	25.44	0.00	2.21	93.9
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/kg	0	29098.09	29098.09	1	1	100.0	51	51	100.0	29098.09	36897.85	0.00	2.98	100.0
PH	(-1.OG(H+(CONCN))	mg/kg	0	5.81	5.81	1	1	100.0	49	49	100.0	5.81	6.03	0.00	1.10	100.0
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/kg	0	27959.47	27959.47	1	1	100.0	42	42	100.0	27959.47	20347.70	0.00	4.43	100.0
RST	RESIDUE, TOTAL	mg/kg	0	79043.00	79043.00	1	1	100.0	51	51	100.0	79043.00	32783.51	0.00	1.81	100.0
RSTLOI	RESIDUE,TOT.LOSS ON IGNI.	mg/kg	0	51591.00	51591.00	1	1	100.0	51	51	100.0	51591.00	20803.05	0.00	1.77	100.0
METALS																
AGUT	SILVER,UNFILT.TOTAL	mg/kg	0	34.03	34.03	1	1	100.0	45	40	88.9	34.03	30.17	0.00	2.61	84.4
ALUT	ALUMINUM,UNFILT.TOTAL	mg/kg	0	37925.43	37925.43	1	1	100.0	51	51	100.0	37925.43	9835.74	0.00	2.51	100.0
ASUT	ARSENIC,UNFILT.TOTAL	mg/kg	0	41.50	41.50	1	1	100.0	51	50	98.0	41.50	6.13	0.00	2.01	97.1
CDUT	CADMIUM,UNFILT.TOTAL	mg/kg	0	22.90	22.90	1	1	100.0	43	40	93.0	22.90	9.74	0.00	4.35	90.0
COUT	COBALT,UNFILT.TOTAL	mg/kg	0	19.10	19.10	1	1	100.0	41	30	73.2	19.10	9.29	0.00	4.69	73.3
CRUT	CHROMIUM,UNFILT.TOTAL	mg/kg	0	384.22	384.22	1	1	100.0	51	50	98.0	384.22	301.43	0.00	3.68	97.1
CUUT	COPPER,UNFILT.TOTAL	mg/kg	0	652.05	652.05	1	1	100.0	46	46	100.0	652.05	606.31	0.00	1.72	100.0
HGUT	MERCURY,UNFILT.TOTAL	mg/kg	0	1.39	1.39	1	1	100.0	50	50	100.0	1.39	2.23	0.00	1.67	100.0
MOUT	MOLYBDENUM,UNFILT.TOTAL	mg/kg	0	5.69	5.69	1	1	100.0	37	23	62.2	5.69	5.80	0.00	2.88	64.3
NIUT	NICKEL,UNFILT.TOTAL	mg/kg	0	448.36	448.36	1	1	100.0	46	44	95.7	448.36	59.17	0.00	2.90	93.3
PBUT	LEAD,UNFILT.TOTAL	mg/kg	0	213.43	213.43	1	1	100.0	49	48	98.0	213.43	173.99	0.00	2.24	96.9
SEUT	SELENIUM,UNFILT.TOTAL	mg/kg	0	17.59	17.59	1	1	100.0	50	48	96.0	17.59	3.04	0.00	1.93	93.9
SRUT	STRONTIUM,UNFILT.TOTAL	mg/kg	0	293.51	293.51	1	1	100.0	51	51	100.0	293.51	231.70	0.00	1.97	100.0
ZNUT	ZINC,UNFILT.TOTAL	mg/kg	0	715.18	715.18	1	1	100.0	51	51	100.0	715.18	905.39	0.00	2.39	100.0
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PMMCRE	M-CRESOL	ug/kg	1	134104.20	134104.20	1	1	100.0	51	42	82.3	134104.20	116847.30	0.00	12.16	85.3
PNPHEN	PHENANTHRENE	ug/kg	1	3529.70	3529.70	1	1	100.0	51	6	11.8	3529.70	3563.50	0.00	2.19	17.7
DIOXINS AND FURANS																
P95CDF	PENTACHLORODIBENZOFURAN	ug/kg	1	2.50	2.50	1	1	100.0	50	1	2.0	2.50	3.90	0.00	3.57	2.9
P96CDF	HEXACHLORODIBENZOFURAN	ug/kg	1	3.80	3.80	1	1	100.0	50	1	2.0	3.80	5.50	0.00	4.45	2.9
P97CDF	HEPTACHLORODIBENZOFURAN	ug/kg	1	25.30	25.30	1	1	100.0	50	1	2.0	25.30	7.20	0.00	4.98	2.9
P98CDD	OCTACHLORODIBENZODIOXIN	ug/kg	1	3.30	3.30	1	1	100.0	50	25	50.0	3.30	8.50	0.00	3.60	58.8
P98CDF	OCTACHLORODIBENZOFURAN	ug/kg	1	6.30	6.30	1	1	100.0	50	4	8.0	6.30	5.40	0.00	3.48	11.8
PESTICIDES,HERBICIDES,PCBS																
P1BHCG	GAMMA-BHC(HEXCHLORCYCLHEXANE)	ug/kg	2	38.00	38.00	1	1	100.0	51	28	54.9	38.00	8.90	0.00	2.69	67.7
P1PCBT	PCB, TOTAL	ug/kg	2	122.70	122.70	1	1	100.0	51	40	78.4	122.70	88.70	0.00	3.18	79.4
P245T	2,4,5-TRICLORPHENOXYACETIC ACID	ug/kg	3	35.40	35.40	1	1	100.0	51	21	41.2	35.40	48.90	0.00	3.49	47.1
P24D	2,4-DICHLOROPHENOXYACETIC ACID	ug/kg	3	341.60	341.60	1	1	100.0	51	38	74.5	341.60	93.20	0.00	6.50	82.3
P5SILV	SILVEX	ug/kg	3	43.00	43.00	1	1	100.0	51	23	45.1	43.00	47.30	0.00	3.40	55.9
VOLATILE ORGANIC COMPOUNDS																

PLANT NAME : Windsor (Westerly)
PLANT TYPE : Primary

SAMPLING TYPE : Raw Sludge
SAMPLE FORM : Dry Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS (DRY WEIGHT)	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
VOLATILE ORGANIC COMPOUNDS																
BZEBNZ	ETHYLBENZENE (C8H10)	ug/kg	1	2530.30	2530.30	1	1	100.0	51	10	19.6	2530.30	890.70	0.00	2.60	26.5
B2MPXY	M-, AND P-XYLENES	ug/kg	1	10247.60	10247.60	1	1	100.0	51	16	31.4	10247.60	1345.90	0.00	3.86	41.2
B2OXYL	O-XYLENE (C8H10)	ug/kg	1	5060.50	5060.50	1	1	100.0	51	8	15.7	5060.50	841.60	0.00	2.51	23.5
X1CHLO	CHLOROFORM (CHCL3)	ug/kg	1	16446.70	16446.70	1	1	100.0	51	12	23.5	16446.70	1225.10	0.00	4.24	35.3
X1TETR	TETRACHLOROETHYLENE	ug/kg	1	3162.80	3162.80	1	1	100.0	51	3	5.9	3162.80	661.30	0.00	1.90	8.8

PLANT NAME : Windsor (Westerly)
PLANT TYPE : Primary

SAMPLING TYPE : Treated Sludge
SAMPLE FORM : Dry Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS (DRY WEIGHT)	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
COD	CHEMICAL OXYGEN DEMAND	mg/kg	0	1054687.50	1054687.50	1	1	100.0	36	36	100.0	1054687.50	508097.94	0.00	4.65	100.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/kg	0	20899.99	20899.99	1	1	100.0	49	49	100.0	20899.99	38494.12	0.00	1.77	100.0
PH	(-LOG(H+(CONCN))	mg/kg	0	6.90	6.90	1	1	100.0	47	47	100.0	6.90	7.17	0.00	1.09	100.0
PHENOL	PHENOLICS (4AAP)	mg/kg	0	46.88	46.88	1	1	100.0	49	41	83.7	46.88	43.05	0.00	3.14	87.9
PPUT	PHOSPHORUS,UNFILT.TOTAL	mg/kg	0	5948160.00	5948160.00	1	1	100.0	43	43	100.0	5948160.00	76638.67	0.00	6.91	100.0
RST	RESIDUE, TOTAL	mg/kg	0	256000.00	256000.00	1	1	100.0	50	50	100.0	256000.00	80434.06	0.00	3.23	100.0
RSTLOI	RESIDUE,TOT.LOSS ON IGNI.	mg/kg	0	165632.00	165632.00	1	1	100.0	50	50	100.0	165632.00	43379.33	0.00	3.19	100.0
METALS																
ALUT	ALUMINUM,UNFILT.TOTAL	mg/kg	0	33693.05	33693.05	1	1	100.0	50	50	100.0	33693.05	10715.94	0.00	2.82	100.0
ASUT	ARSENIC,UNFILT.TOTAL	mg/kg	0	0.43	0.43	1	1	100.0	50	49	98.0	0.43	5.40	0.00	2.06	97.1
CDUT	CADMIUM,UNFILT.TOTAL	mg/kg	0	17.11	17.11	1	1	100.0	45	41	91.1	17.11	10.47	0.00	3.98	90.3
COUT	COBALT,UNFILT.TOTAL	mg/kg	0	19.26	19.26	1	1	100.0	39	32	82.1	19.26	9.14	0.00	2.75	85.7
CRUT	CHROMIUM,UNFILT.TOTAL	mg/kg	0	363.13	363.13	1	1	100.0	50	50	100.0	363.13	333.06	0.00	3.59	100.0
CUUT	COPPER,UNFILT.TOTAL	mg/kg	0	615.16	615.16	1	1	100.0	45	45	100.0	615.16	732.24	0.00	2.16	100.0
HGUT	MERCURY,UNFILT.TOTAL	mg/kg	0	1.25	1.25	1	1	100.0	50	49	98.0	1.25	3.24	0.00	2.04	97.1
NIUT	NICKEL,UNFILT.TOTAL	mg/kg	0	405.35	405.35	1	1	100.0	45	42	93.3	405.35	72.95	0.00	2.95	90.0
PBUT	LEAD,UNFILT.TOTAL	mg/kg	0	195.70	195.70	1	1	100.0	50	49	98.0	195.70	196.62	0.00	2.46	97.1
SEUT	SELENIUM,UNFILT.TOTAL	mg/kg	0	0.20	0.20	1	1	100.0	50	48	96.0	0.20	2.67	0.00	2.98	97.1
SRUT	STRONTIUM,UNFILT.TOTAL	mg/kg	0	232.89	232.89	1	1	100.0	50	50	100.0	232.89	240.93	0.00	2.54	100.0
ZNUT	ZINC,UNFILT.TOTAL	mg/kg	0	637.85	637.85	1	1	100.0	50	50	100.0	637.85	988.90	0.00	2.57	100.0
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PMBBP	BUTYLBENZYLPHTHALATE	ug/kg	1	20703.10	20703.10	1	1	100.0	50	8	16.0	20703.10	1916.90	0.00	5.23	17.7
DIOXINS AND FURANS																
P95CDF	PENTACHLORODIBENZOFURAN	ug/kg	1	1.60	1.60	1	1	100.0	49	1	2.0	1.60	2.50	0.00	5.12	2.9
P97CDD	HEPTACHLORODIBENZODIOXIN	ug/kg	1	2.30	2.30	1	1	100.0	49	10	20.4	2.30	5.00	0.00	3.21	23.5
P98CDD	OCTACHLORODIBENZODIOXIN	ug/kg	1	13.70	13.70	1	1	100.0	49	26	53.1	13.70	7.10	0.00	3.84	64.7
PESTICIDES,HERBICIDES,PCBS																
P1ALDR	ALDRIN	ug/kg	1	32.80	32.80	1	1	100.0	50	11	22.0	32.80	5.30	0.00	2.67	26.5
P1BHCB	BETA-BHC (HEXACHLORCYCLOHEXANE)	ug/kg	1	267.10	267.10	1	1	100.0	50	19	38.0	267.10	8.80	0.00	4.39	47.1
P1BHCD	DELTA-BHC(HEXACHLORCYCLOHEXANE)	ug/kg	1	10.10	10.10	1	1	100.0	50	4	8.0	10.10	3.90	0.00	1.93	11.8
P1BHCG	GAMMA-BHC(HEXACHLORCYCLOHEXANE)	ug/kg	2	74.40	74.40	1	1	100.0	50	12	24.0	74.40	5.70	0.00	3.13	35.3
P1CHLA	ALPHA-CHLORDANE	ug/kg	1	36.50	36.50	1	1	100.0	50	22	44.0	36.50	6.50	0.00	2.41	55.9
P1CHLG	GAMMA-CHLORDANE	ug/kg	1	38.00	38.00	1	1	100.0	50	21	42.0	38.00	6.80	0.00	2.58	52.9
P1DIEL	DIELDRIN	ug/kg	2	40.60	40.60	1	1	100.0	50	15	30.0	40.60	6.50	0.00	3.51	38.2
P1DMDT	METHOXYCHLOR	ug/kg	1	73.80	73.80	1	1	100.0	50	15	30.0	73.80	34.10	0.00	4.42	38.2
P1END2	ENDOSULFAN II	ug/kg	3	21.60	21.60	1	1	100.0	50	7	14.0	21.60	4.70	0.00	2.67	20.6
P1ENDR	ENDRIN	ug/kg	3	18.10	18.10	1	1	100.0	50	5	10.0	18.10	4.20	0.00	2.36	14.7
P1ENDS	ENDOSULFAN SULPHATE	ug/kg	3	35.20	35.20	1	1	100.0	50	6	12.0	35.20	17.50	0.00	2.53	17.7
P1OCHL	OXYCHLORDANE	ug/kg	2	23.80	23.80	1	1	100.0	50	6	12.0	23.80	4.20	0.00	2.24	17.7
P1PCBT	PCB, TOTAL	ug/kg	2	4175.20	4175.20	1	1	100.0	50	32	64.0	4175.20	114.10	0.00	4.58	67.7

PLANT NAME : Windsor (Westerly)
PLANT TYPE : Primary

SAMPLING TYPE : Treated Sludge
SAMPLE FORM : Dry Weight

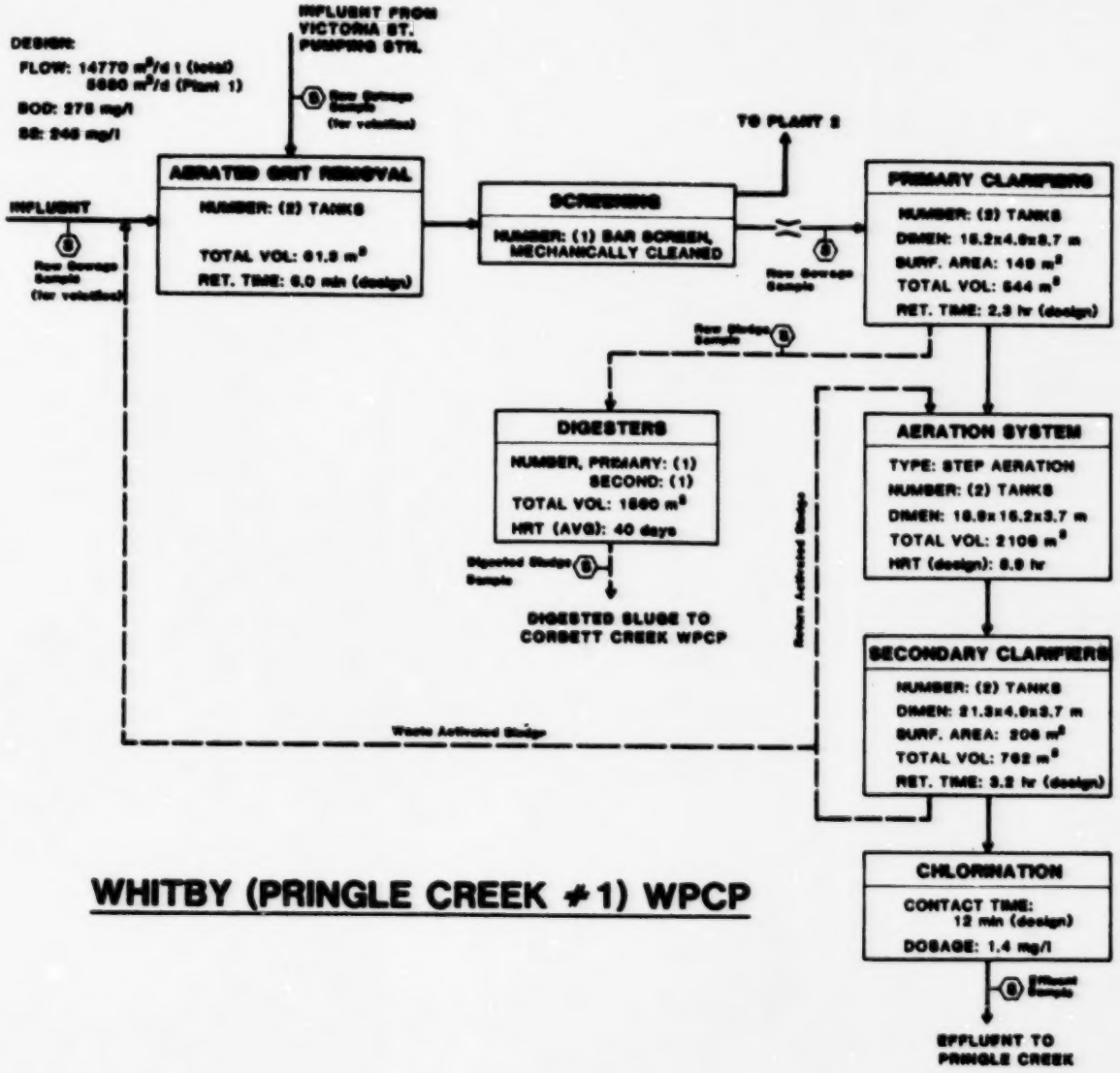
CONTAM-INANT	CONTAMINANT NAME	UNITS (DRY WEIGHT)	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
P1PDD	PP-DDD	ug/kg	1	22.10	22.10	1	1	100.0	50	7	14.0	22.10	4.60	0.00	2.47	20.6
P1PDE	PP-DDE	ug/kg	1	18.30	18.30	1	1	100.0	50	34	68.0	18.30	11.10	0.00	2.72	73.5
P24D	2,4-DICHLOROPHENOXYACETIC ACID	ug/kg	3	263.10	263.10	1	1	100.0	50	25	50.0	263.10	75.00	0.00	5.81	64.7
X1HCCP	HEXACHLOROCYCLOPENTADIENE	ug/kg	3	308.10	308.10	1	1	100.0	50	8	16.0	308.10	34.20	0.00	2.76	23.5
	VOLATILE ORGANIC COMPOUNDS															
B2EBNZ	ETHYLBENZENE (C8H10)	ug/kg	1	2539.10	2539.10	1	1	100.0	50	14	28.0	2539.10	606.50	0.00	5.59	32.4
B2MPXY	M-, AND P-XYLENES	ug/kg	1	5078.10	5078.10	1	1	100.0	50	15	30.0	5078.10	816.00	0.00	7.11	32.4
B2OXYL	O-XYLENE (C8H10)	ug/kg	1	3906.20	3906.20	1	1	100.0	50	14	28.0	3906.20	523.50	0.00	4.05	32.4
X1CHLO	CHLOROFORM (CHCL3)	ug/kg	1	859.40	859.40	1	1	100.0	50	12	24.0	859.40	441.70	0.00	4.33	35.3
X1TETR	TETRACHLOROETHYLENE	ug/kg	1	3359.40	3359.40	1	1	100.0	50	2	4.0	3359.40	285.40	0.00	3.51	5.9
X1TRIC	TRICHLOROETHYLENE-C2HCL3	ug/kg	1	937.50	937.50	1	1	100.0	50	1	2.0	937.50	261.30	0.00	3.34	2.9

Sub-Appendix A-37

Whitby (Pringle Creek #1) WPCP

Contents:

- Plant Schematic with Design Characteristics
- Annual Data Review (1981 - 1986 Plant Performance)
- Sources of Municipal Water Pollution Control Plant Raw Sewage
- Operational Evaluation for Whitby (Pringle Creek #1) WPCP
- Analytical Data



WHITBY (PRINGLE CREEK #1) WPCP

CANVIRO

PRINGLE CREEK WPCP NO.1
Conventional Activated Sludge
Phosphorus Removal - Continuous
Capacity - 5.683 10(3)m3/day

PARAMETER	1981	1982	1983	1984	1985	MEAN ANNUAL AVERAGE
Avg. Daily Flow (1000 m3/day)	4.42	4.30	4.25	6.03	5.49	4.90
BOD5 - Influent (mg/L)	115.00	179.90	72.11	110.11	105.57	110.14
BOD5 - Effluent (mg/L)	4.00	13.00	5.70	20.15	19.26	12.60
Annual BOD5 Significantly Different from Mean Annual Average BOD5?	I.D.	I.D.	I.D.	I.D.	I.D.	
TSS - Influent (mg/L)	165.00	215.50	139.22	163.02	179.26	172.96
TSS - Effluent (mg/L)	6.00	12.60	9.02	14.42	14.53	11.47
Annual TSS Significantly Different from Mean Annual Average TSS?	I.D.	I.D.	I.D.	I.D.	I.D.	
Total P - Influent (mg/L)	7.30	7.04	4.60	3.70	2.76	5.27
Total P - Effluent (mg/L)	0.54	0.62	0.30	0.90	0.70	0.63
Annual TP Significantly Different from Mean Annual Average TP?	I.D.	I.D.	I.D.	I.D.	I.D.	
TP in Compliance?	Y	Y	Y	Y	Y	Y

I.D. - Insufficient Data

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SOURCES OF MUNICIPAL WATER POLLUTION CONTROL PLANT RAW SEWAGE

GENERAL DESCRIPTION OF WATER POLLUTION CONTROL PLANT (WPCP)

NAME OF WPCP	PRINGLE CREEK WPCP
WORKS NUMBER	120003101
TREATMENT TYPE	CONVENTIONAL ACTIVATED SLUDGE PHOSPHORUS REMOVAL CONTINUOUS
DESIGN CAPACITY (1000 m3/d)	9.092
1986 AVERAGE DAY FLOW (1000 m3/d)	7.133
POPULATION SERVED	10925

% OF TOTAL FLOW ATTRIBUTED TO:

INDUSTRIAL SOURCES (%)	22
COMMERCIAL SOURCES (%) (Population x 0.0757)	12
RESIDENTIAL SOURCES (%) (Population x 0.175)	27
UNACCOUNTED FOR, INCL. INFILTRATION (100-% Contributed from industrial, commercial and residential sources)	40

PROFILE OF INDUSTRIES IN CATCHMENT

TOTAL NO OF INDUSTRIES	108
INDUSTRIES WITH WATER	24
NO OF SIC CATEGORIES	29

DESCRIPTION OF THE TOP 5 INDUSTRIES DISCHARGED TO THE WPCP (BASED ON WATER USE DATA)

DESCRIPTION	SIC	# OF COMPANIES
FRUIT AND VEGETABLES	2032-2038	1
ELECTRICAL & ELECTRONIC COMPONENTS	3612-3690	6
MISC. CONVERTED PAPER PRODUCTS	2640-2655	2
ELECTROPLATING	3471-3471	2
WOOD & METAL FURNITURE MFG	2510-2599	5

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OPERATIONAL EVALUATION FOR: WHITBY (PRINGLE CREEK-PLANT#1) WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: May 22, 1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 14,770 m3/d - Total (5,680 m3/d - Plant #1)

	PRE-SAMPLING PERIOD						
PARAMETER	DAY 1	DAY 2	DAY 3	DAY 4	DAY 5	DAY 6	DAY 7
RAW SEWAGE FLOW	2,710	2,684	2,684	2,668	2,384		
Plant #1							
% of Design Flow	47.71%	47.25%	47.25%	46.97%	41.97%		
Influent BOD (mg/L)	165.0	115.0	355.0	197.0	176.0		
Primary BOD (mg/L)							
Secondary BOD (mg/L)	34.0	33.0	30.0	25.0	53.0		
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	79.4	71.3	91.5	87.3	69.9		
Influent SS (mg/L)	100.0	76.0	365.0	388.0	300.0		
Primary SS (mg/L)							
Secondary SS (mg/L)	5.5	7.3	5.0	6.0	4.3		
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	94.5	90.4	98.6	98.5	98.6		
Influent NH4 (mg/L)	19.8	19.4	20.5	27.2	22.1		
Primary NH4 (mg/L)							
Secondary NH4 (mg/L)	6.9	8.4	7.4	3.5			
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	65.2	56.7	63.9	87.1			
Influent TKN (mg/L)	32.3	30.5	48.5	43.0	34.3		
Primary TKN (mg/L)							
Secondary TKN (mg/L)	8.7	10.7	9.8	6.8	3.5		
% PRIMARY REMOVAL							
% SECONDARY REMOVAL	73.1	64.9	79.8	84.2	89.8		
Influent Total P (mg/L)							
Primary Total P (mg/L)							
Secondary Total P (mg/L)							
% PRIMARY REMOVAL							
% SECONDARY REMOVAL							

Note: Data was obtained from MOE reports

OPERATIONAL EVALUATION FOR: WHITBY (PRINGLE CREEK-PLANT#1) WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: May 22, 1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 14,770 m3/d - Total (5,690 m3/d - Plant #1)

PARAMETER	PRE-SAMPLING PERIOD							
	DAY 8	DAY 9	DAY 10	DAY 11	DAY 12	DAY 13	DAY 14	
RAW SEWAGE FLOW Plant #1	3,178	2,950	2,915	2,852	2,568	2,590	2,493	
% of Design Flow	55.95%	51.94%	51.32%	50.21%	45.21%	45.60%	43.89%	
Influent BOD (mg/L)								
Primary BOD (mg/L)								
Secondary BOD (mg/L)								
% PRIMARY REMOVAL								
% SECONDARY REMOVAL								
Influent SS (mg/L)								
Primary SS (mg/L)								
Secondary SS (mg/L)								
% PRIMARY REMOVAL								
% SECONDARY REMOVAL								
Influent NH4 (mg/L)								
Primary NH4 (mg/L)								
Secondary NH4 (mg/L)								
% PRIMARY REMOVAL								
% SECONDARY REMOVAL								
Influent TKN (mg/L)								
Primary TKN (mg/L)								
Secondary TKN (mg/L)								
% PRIMARY REMOVAL								
% SECONDARY REMOVAL								
Influent Total P (mg/L)								
Primary Total P (mg/L)								
Secondary Total P (mg/L)	0.23	0.23	0.20	0.25	0.30			Plant #1 only
% PRIMARY REMOVAL								
% SECONDARY REMOVAL								

Note: Data was obtained from MOE reports

OPERATIONAL EVALUATION FOR: WHITBY (PRINGLE CREEK-PLANT#1) WPCP

TREATMENT FACILITY: Secondary
PERIOD ENDING: May 22, 1987
SAMPLING SEASON: Summer (Warm Weather)
DESIGN AVG FLOW: 14,770 m3/d - Total (5,680 m3/d - Plant #1)

	SAMPLING PERIOD							
PARAMETER	DAY 15	DAY 16	DAY 17	DAY 18	DAY 19	DAY 20	DAY 21	
RAW SEWAGE FLOW	3,079	2,824	2,717	2,930	2,753	2,164	2,082	
Plant #1								
% of Design Flow	54.21%	49.72%	47.83%	51.58%	48.47%	38.10%	36.65%	
Influent BOD (mg/L)								
Primary BOD (mg/L)								
Secondary BOD (mg/L)								
% PRIMARY REMOVAL								
% SECONDARY REMOVAL								
Influent SS (mg/L)								
Primary SS (mg/L)								
Secondary SS (mg/L)								
% PRIMARY REMOVAL								
% SECONDARY REMOVAL								
Influent NH4 (mg/L)								
Primary NH4 (mg/L)								
Secondary NH4 (mg/L)								
% PRIMARY REMOVAL								
% SECONDARY REMOVAL								
Influent TKN (mg/L)								
Primary TKN (mg/L)								
Secondary TKN (mg/L)								
% PRIMARY REMOVAL								
% SECONDARY REMOVAL								
Influent Total P (mg/L)								
Primary Total P (mg/L)								
Secondary Total P (mg/L)	0.50	0.63	0.69	0.69	0.83			Plant #1 only
% PRIMARY REMOVAL								
% SECONDARY REMOVAL								

PLANT NAME : Whitby (Pringle Creek #1)
PLANT TYPE : Secondary

SAMPLING TYPE : Raw Sewage
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	PLANT MIN. CONC. > MDL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0	115.00	355.00	5	5	100.0	267	266	99.6	187.79	140.23	1.51	1.93	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0	272.00	786.00	4	4	100.0	260	258	99.2	426.97	287.75	1.63	1.82	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0	18.50	22.00	5	5	100.0	271	271	100.0	20.04	22.39	1.09	1.81	100.0
NNHTPR	AMMONIUM,TOTAL FILT.REAC.	mg/L	0	19.40	27.20	5	5	100.0	275	274	99.6	21.63	15.37	1.15	1.69	100.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0	30.50	48.50	5	5	100.0	273	273	100.0	37.12	25.44	1.22	1.47	100.0
PH	(-LOG(H+(CONCN))		0	6.81	7.15	5	5	100.0	275	275	100.0	7.02	6.90	1.02	1.05	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0	76.20	388.00	5	5	100.0	267	266	99.6	200.26	126.88	2.16	1.93	100.0
NNO2PR	NITRITE,FILT. REACT.	mg/L	0	0.03	0.03	5	1	20.0	271	58	21.4	0.00	0.01	2.71	2.98	51.4
PHNOL	PHENOLICS (4AAP)	mg/L	0	5.00	5.00	5	1	20.0	275	37	13.5	0.46	0.31	3.82	2.05	37.8
METALS																
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	500.00	15000.00	6	6	100.0	322	306	95.0	4240.00	1000.10	4.58	2.65	97.3
CUUT	COPPER,UNFILT.TOTAL	ug/L	0	160.00	160.00	1	1	100.0	49	48	98.0	160.00	110.60	0.00	2.28	97.1
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	0.22	0.57	5	5	100.0	283	274	96.8	0.37	0.23	1.59	2.11	100.0
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	10.00	270.00	6	6	100.0	319	318	99.7	140.00	370.70	3.69	2.14	100.0
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	60.00	250.00	6	6	100.0	322	315	97.8	140.00	211.00	1.96	2.94	100.0
CDUT	CADMIUM,UNFILT.TOTAL	ug/L	0	40.00	60.00	6	5	83.3	322	76	23.6	30.00	6.50	2.62	2.09	70.3
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	170.00	570.00	6	4	66.7	322	237	73.6	90.00	51.10	5.78	3.44	89.2
COUT	COBALT,UNFILT.TOTAL	ug/L	0	10.00	20.00	6	3	50.0	322	82	25.5	10.00	9.30	1.76	2.31	83.8
AGUT	SILVER,UNFILT.TOTAL	ug/L	0	20.00	20.00	6	1	16.7	321	82	25.6	10.00	10.40	1.76	2.55	75.7
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PMMCRE	M-CRESOL	ug/L	1	45.10	249.20	5	3	60.0	275	167	60.7	40.65	25.59	5.31	3.45	86.5
PMPHEN	PHENOL	ug/L	2	17.00	56.70	5	3	60.0	275	118	42.9	18.73	14.52	2.58	2.46	78.4
PESTICIDES,HERBICIDES,PCBS																
P324D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	0.20	0.77	5	5	100.0	276	214	77.5	0.34	0.13	1.70	3.72	100.0
P1BHCG	GAMMA-BHC(HEXCHLORCYCLHEXANE)	ug/L	2	0.02	0.02	5	1	20.0	276	143	51.8	0.01	0.02	1.36	2.29	94.6
P245ST	2,4,5-TRICLORPHENOXYACETIC ACID	ug/L	3	0.11	0.11	5	1	20.0	276	22	8.0	0.06	0.06	1.42	1.60	37.8

PLANT NAME : Whitby (Pringle Creek)
PLANT TYPE : Secondary

SAMPLING TYPE : Final Effluent
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	STD. FOR SURFACE WATER	STD. REF.	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET.	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																		
BOD5	BOD, 5 DAY -TOTAL DEMAND	mg/L	0		-	24.70	52.60	5	5	100.0	213	211	99.1	33.74	21.22	1.32	2.07	100.0
COD	CHEMICAL OXYGEN DEMAND	mg/L	0		-	114.00	226.00	4	4	100.0	213	211	99.1	142.76	52.80	1.36	1.83	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0		-	5.70	8.80	5	5	100.0	220	220	100.0	6.81	8.09	1.22	1.60	100.0
NNO2FR	NITRITE,FILT. REACT.	mg/L	0		-	0.54	1.26	5	5	100.0	220	194	88.2	0.70	0.22	1.42	5.95	96.4
NNO3FR	NITRATES,TOTAL FILT.REAC.	mg/L	0		-	16.60	21.50	5	5	100.0	224	186	83.0	19.20	2.33	1.13	7.75	96.4
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0		-	3.50	10.70	5	5	100.0	222	222	100.0	7.37	7.97	1.57	2.71	100.0
PH	(-LOG(H+(CONCN))		0		-	6.93	7.48	5	5	100.0	224	224	100.0	7.26	7.10	1.03	1.05	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0		-	4.30	7.30	5	5	100.0	220	219	99.6	5.49	10.12	1.22	2.00	100.0
NNHTPR	AMMONIUM,TOTAL FILT.REAC.	mg/L	0		-	3.45	8.40	5	4	80.0	223	204	91.5	2.71	3.90	6.53	6.98	100.0
PHNOL	PHENOLICS (4AAP)	mg/L	0	0.00	ONT-MOE	0.68	0.68	5	1	20.0	225	33	14.7	0.08	0.07	3.21	1.86	53.6
METALS																		
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	75.00	ONT-MOE	230.00	340.00	6	6	100.0	264	196	74.2	300.00	101.70	1.16	3.72	96.4
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	0.20	ONT-MOE	0.02	0.11	5	5	100.0	233	220	94.4	0.03	0.03	2.09	2.62	100.0
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	3750.00	ONT-MOE	180.00	210.00	6	6	100.0	267	267	100.0	190.00	340.90	1.06	2.14	100.0
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	30.00	ONT-MOE	20.00	60.00	6	6	100.0	267	262	98.1	30.00	53.30	1.49	2.48	100.0
CDUT	CADMIUM,UNFILT.TOTAL	ug/L	0	0.20	ONT-MOE	0.00	10.00	6	3	50.0	267	65	24.3	0.00	2.10	2.04	2.07	71.4
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	100.00	ONT-MOE	10.00	30.00	6	3	50.0	267	137	51.3	10.00	9.00	2.20	2.00	89.3
NIUT	NICKEL,UNFILT.TOTAL	ug/L	0	25.00	ONT-MOE	20.00	20.00	6	2	33.3	267	171	64.0	10.00	22.10	2.23	3.60	85.7
AGUT	SILVER,UNFILT.TOTAL	ug/L	0	0.10	ONT-MOE	10.00	10.00	6	1	16.7	267	15	5.6	10.00	6.90	1.33	1.84	32.1
COUT	COBALT,UNFILT.TOTAL	ug/L	0	5.00	NYS-STD	10.00	10.00	6	1	16.7	266	65	24.4	10.00	6.40	1.33	1.54	82.1
PBUT	LEAD,UNFILT.TOTAL	ug/L	0	25.00	ONT-MOE	30.00	30.00	6	1	16.7	267	25	9.4	20.00	16.50	1.67	1.48	60.7
PESTICIDES,HERBICIDES,PCBS																		
P324D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	4.00	ONT-MOE	0.39	34.00	5	5	100.0	227	177	78.0	1.48	0.08	6.17	4.71	100.0
P1BHCG	GAMMA-BHC(HEXCHLORCYCLOHEXANE)	ug/L	2	0.06	ONT-MOE	0.01	0.01	5	4	80.0	227	157	69.2	0.01	0.02	1.36	2.48	96.4
P245T	2,4,5-TRICLORPHENOXYACETIC ACID	ug/L	3		-	0.96	2.30	5	4	80.0	227	25	11.0	0.70	0.03	6.62	2.27	42.9
P5SILV	SILVEX	ug/L	3		-	0.06	2.90	5	3	60.0	227	23	10.1	0.12	0.03	7.35	1.83	50.0

PLANT NAME : Whitby (Pringle Creek #1)
PLANT TYPE : Secondary

SAMPLING TYPE : Recycle
SAMPLE FORM : Wet Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS	QC CODE	PLANT MIN. CONC. > MDL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
COD	CHEMICAL OXYGEN DEMAND	mg/L	0	30300.00	48800.00	3	3	100.0	39	39	100.0	41287.93	3439.26	1.31	4.55	100.0
DOC	DISSOLVED ORGANIC CARBON	mg/L	0	40.00	212.00	3	3	100.0	42	42	100.0	79.83	77.62	2.39	3.54	100.0
NNHTFR	AMMONIUM,TOTAL FILT.REAC.	mg/L	0	33.80	53.70	3	3	100.0	44	44	100.0	44.18	146.20	1.27	2.07	100.0
NNO2FR	NITRITE,FIL.T. REACT.	mg/L	0	0.03	0.05	3	3	100.0	42	36	85.7	0.03	0.05	1.43	3.13	100.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/L	0	436.00	625.00	3	3	100.0	42	42	100.0	523.01	324.28	1.20	1.95	100.0
PH	(-LOG(H+(CONCN))		0	6.51	6.68	3	3	100.0	44	44	100.0	6.57	6.94	1.01	1.05	100.0
RSP	RESIDUE, PARTICULATE	mg/L	0	502.00	9190.00	3	3	100.0	42	42	100.0	3064.79	2242.77	4.85	3.60	100.0
NNOTFR	NITRATES,TOTAL FIL.T.REAC.	mg/L	0	0.25	0.25	3	1	33.3	44	39	88.6	0.09	0.41	3.19	2.66	100.0
PHNOL	PHENOLICS (4AAP)	mg/L	0	7.40	7.40	3	1	33.3	44	11	25.0	0.77	0.41	7.07	3.16	55.6
METALS																
ALUT	ALUMINUM,UNFILT.TOTAL	ug/L	0	400000.00	700000.00	4	4	100.0	53	53	100.0	549150.00	28798.20	1.26	4.42	100.0
ASUT	ARSENIC,UNFILT.TOTAL	ug/L	0	50.00	60.00	4	4	100.0	51	27	52.9	50.00	37.50	1.10	2.92	66.7
CAUT	CALCIUM,UNFILT.TOTAL	ug/L	0	230000.00	320000.00	4	4	100.0	54	54	100.0	272570.00	208447.60	1.17	1.87	100.0
CDUT	CADMIUM,UNFILT.TOTAL	ug/L	0	860.00	1200.00	4	4	100.0	53	37	69.8	1060.00	58.40	1.15	6.63	77.8
CRUT	CHROMIUM,UNFILT.TOTAL	ug/L	0	2300.00	4200.00	4	4	100.0	53	51	96.2	3290.00	874.70	1.31	6.11	100.0
CUUT	COPPER,UNFILT.TOTAL	ug/L	0	5200.00	5200.00	1	1	100.0	12	12	100.0	5200.00	1814.00	0.00	5.64	100.0
FEUT	IRON,UNFILT.TOTAL	ug/L	0	34000.00	54000.00	4	4	100.0	53	53	100.0	45820.00	109943.30	1.23	4.19	100.0
HGUT	MERCURY,UNFILT.TOTAL	ug/L	0	0.54	11.00	3	3	100.0	47	44	93.6	3.62	1.68	5.24	4.49	100.0
MGUT	MAGNESIUM,UNFILT.TOTAL	ug/L	0	34000.00	41000.00	4	4	100.0	54	54	100.0	36630.00	41620.20	1.10	1.78	100.0
SEUT	SELENIUM,UNFILT.TOTAL	ug/L	0	30.00	50.00	4	4	100.0	51	25	49.0	40.00	44.20	1.28	3.52	55.6
SRUT	STRONTIUM,UNFILT.TOTAL	ug/L	0	1500.00	1800.00	4	4	100.0	53	53	100.0	1700.00	1347.00	1.09	2.13	100.0
ZNUT	ZINC,UNFILT.TOTAL	ug/L	0	3100.00	4900.00	4	4	100.0	53	53	100.0	4000.00	3112.40	1.21	7.41	100.0
AGUT	SILVER,UNFILT.TOTAL	ug/L	0	110.00	170.00	4	3	75.0	53	42	79.3	90.00	72.30	2.42	4.09	100.0
MOUT	MOLYBDENUM,UNFILT.TOTAL	ug/L	0	130.00	140.00	4	3	75.0	54	18	33.3	100.00	35.60	1.60	4.15	77.8
COUT	COBALT,UNFILT.TOTAL	ug/L	0	90.00	90.00	4	1	25.0	53	21	39.6	30.00	23.60	1.90	4.63	88.9
NIUT	NICKEL,UNFILT.TOTAL	ug/L	0	370.00	370.00	4	1	25.0	53	41	77.4	160.00	308.60	1.72	3.08	88.9
PBUT	LEAD,UNFILT.TOTAL	ug/L	0	710.00	710.00	4	1	25.0	53	36	67.9	320.00	429.50	1.69	6.62	100.0
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PMMCRE	M-CRESOL	ug/L	1	2000.00	2800.00	3	2	66.7	43	27	62.8	943.54	562.69	4.96	5.65	88.9
PMPHEN	PHENOL	ug/L	2	298.30	570.00	3	2	66.7	43	5	11.6	294.36	124.37	1.95	2.60	33.3
PESTICIDES,HERBICIDES,PCBS																
P1CHLG	GAMMA-CHLORDANE	ug/L	1	0.02	0.04	3	2	66.7	44	11	25.0	0.04	0.06	2.24	2.70	44.4
P1PCBT	PCB, TOTAL	ug/L	2	0.17	2.90	3	2	66.7	44	27	61.4	0.58	0.77	4.28	7.58	77.8
P245T	2,4,5-TRICLORPHENOXYACETIC ACID	ug/L	3	0.15	82.00	3	2	66.7	44	18	40.9	0.85	0.43	54.30	4.50	77.8
P24D	2,4-DICHLOROPHENOXYACETIC ACID	ug/L	3	0.42	1.20	3	2	66.7	44	29	65.9	0.22	0.79	8.39	5.21	88.9
P1BHCG	GAMMA-BHC(HEXCHLORCYCLHEXANE)	ug/L	2	0.04	0.04	3	1	33.3	44	17	38.6	0.03	0.08	3.19	2.57	66.7
P1CHLA	ALPHA-CHLORDANE	ug/L	1	0.04	0.04	3	1	33.3	44	11	25.0	0.03	0.06	3.19	2.96	55.6
P1DIEL	DIELDRIN	ug/L	2	0.03	0.03	3	1	33.3	44	7	15.9	0.07	0.06	2.00	2.81	55.6
P1PPDE	PP-DDE	ug/L	1	0.03	0.03	3	1	33.3	44	17	38.6	0.03	0.07	3.16	3.59	55.6
P3SILV	SILVEX	ug/L	3	180.00	180.00	3	1	33.3	44	15	34.1	0.77	0.38	113.04	5.08	66.7
X1HCCP	HEXACHLOROCYCLOPENTADIENE	ug/L	3	0.16	0.16	3	1	33.3	44	6	13.6	0.25	0.48	3.38	3.21	44.4
X2HCB	HEXACHLOROBENZENE	ug/L	2	0.04	0.04	3	1	33.3	44	12	27.3	0.03	0.07	3.19	4.31	66.7

PLANT NAME : Whitby (Pringle Creek #1)
PLANT TYPE : Secondary

SAMPLING TYPE : Raw Sludge
SAMPLE FORM : Dry Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS (DRY WEIGHT)	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
COD	CHEMICAL OXYGEN DEMAND	mg/kg	0	2619047.62	2619047.62	1	1	100.0	45	45	100.0	2619047.62	892221.45	0.00	3.19	100.0
NNHTPR	AMMONIUM,TOTAL FIL.T.REAC.	mg/kg	0	15578.23	15578.23	1	1	100.0	48	47	97.9	15578.23	5911.32	0.00	4.59	100.0
NNOTPR	NITRATES,TOTAL FIL.T.REAC.	mg/kg	0	54.42	54.42	1	1	100.0	48	43	89.6	54.42	25.44	0.00	2.21	93.9
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/kg	0	74829.93	74829.93	1	1	100.0	51	51	100.0	74829.93	36897.85	0.00	2.98	100.0
PH	(-LOG(H+(CONCN))	mg/kg	0	5.76	5.76	1	1	100.0	49	49	100.0	5.76	6.03	0.00	1.10	100.0
PHENOL	PHENOLICS (4AAP)	mg/kg	0	183.67	183.67	1	1	100.0	50	41	82.0	183.67	82.34	0.00	3.54	85.3
RST	RESIDUE, TOTAL	mg/kg	0	14700.00	14700.00	1	1	100.0	51	51	100.0	14700.00	32783.51	0.00	1.81	100.0
RSTLOI	RESIDUE,TOT.LOSS ON IGNI.	mg/kg	0	10000.00	10000.00	1	1	100.0	51	51	100.0	10000.00	20803.05	0.00	1.77	100.0
METALS																
AGUT	SILVER,UNFIL.T.TOTAL	mg/kg	0	40.14	40.14	1	1	100.0	45	40	88.9	40.14	30.17	0.00	2.61	84.4
ALUT	ALUMINUM,UNFIL.T.TOTAL	mg/kg	0	102040.82	102040.82	1	1	100.0	51	51	100.0	102040.82	9835.74	0.00	2.51	100.0
ASUT	ARSENIC,UNFIL.T.TOTAL	mg/kg	0	6.80	6.80	1	1	100.0	51	50	98.0	6.80	6.13	0.00	2.01	97.1
CCNPUR	CYANIDE-FREE,UNFIL.T.REAC.	mg/kg	0	0.48	0.48	1	1	100.0	40	3	7.5	0.48	0.02	0.00	2.74	10.0
CDUT	CADMIUM,UNFIL.T.TOTAL	mg/kg	0	183.67	183.67	1	1	100.0	43	40	93.0	183.67	9.74	0.00	4.35	90.0
COUT	COBALT,UNFIL.T.TOTAL	mg/kg	0	6.80	6.80	1	1	100.0	41	30	73.2	6.80	9.29	0.00	4.69	73.3
CRUT	CHROMIUM,UNFIL.T.TOTAL	mg/kg	0	489.80	489.80	1	1	100.0	51	50	98.0	489.80	301.43	0.00	3.68	97.1
CUUT	COPPER,UNFIL.T.TOTAL	mg/kg	0	952.38	952.38	1	1	100.0	46	46	100.0	952.38	606.31	0.00	1.72	100.0
HGUT	MERCURY,UNFIL.T.TOTAL	mg/kg	0	8.16	8.16	1	1	100.0	50	50	100.0	8.16	2.23	0.00	1.67	100.0
NIUT	NICKEL,UNFIL.T.TOTAL	mg/kg	0	81.63	81.63	1	1	100.0	46	44	95.7	81.63	59.17	0.00	2.90	93.3
PBUT	LEAD,UNFIL.T.TOTAL	mg/kg	0	176.87	176.87	1	1	100.0	49	48	98.0	176.87	173.99	0.00	2.24	96.9
SEUT	SELENIUM,UNFIL.T.TOTAL	mg/kg	0	8.16	8.16	1	1	100.0	50	48	96.0	8.16	3.04	0.00	1.93	93.9
SRUT	STRONTIUM,UNFIL.T.TOTAL	mg/kg	0	367.35	367.35	1	1	100.0	51	51	100.0	367.35	231.70	0.00	1.97	100.0
ZNUT	ZINC,UNFIL.T.TOTAL	mg/kg	0	816.33	816.33	1	1	100.0	51	51	100.0	816.33	905.39	0.00	2.39	100.0
BASE NEUTRAL AND ACID EXTRACTABLE COMPOUNDS																
PMMCRE	M-CRESOL	ug/kg	1	1251700.70	1251700.70	1	1	100.0	51	42	82.3	1251700.70	116847.30	0.00	12.16	85.3
PMPHEN	PHENOL	ug/kg	2	51850.30	51850.30	1	1	100.0	51	15	29.4	51850.30	7312.80	0.00	3.00	38.2
PESTICIDES,HERBICIDES,PCBS																
PLCHLG	GAMMA-CHLORDANE	ug/kg	1	13.60	13.60	1	1	100.0	51	19	37.3	13.60	6.00	0.00	2.44	50.0
PMDMDT	METHOXYCHLOR	ug/kg	1	68.00	68.00	1	1	100.0	51	19	37.3	68.00	45.80	0.00	5.15	44.1
P324D	2,4-DICHLOROPHENOXYACETIC ACID	ug/kg	3	197.30	197.30	1	1	100.0	51	38	74.5	197.30	93.20	0.00	6.50	82.3
VOLATILE ORGANIC COMPOUNDS																
XTCHLO	CHLOROFORM (CHCl3)	ug/kg	1	95238.10	95238.10	1	1	100.0	51	12	23.5	95238.10	1225.10	0.00	4.24	35.3

PLANT NAME : Whitby (Pringle Creek #1)
PLANT TYPE : Secondary

SAMPLING TYPE : Treated Sludge
SAMPLE FORM : Dry Weight

CONTAM-INANT	CONTAMINANT NAME	UNITS (DRY WEIGHT)	QA/QC CODE	PLANT MIN. CONC. > DL	PLANT MAX. DET. CONC.	PLANT # SAMPLES	PLANT # DET.	PLANT % FREQ. DET.	GLOBAL # SAMPLES	GLOBAL # DET	GLOBAL % FREQ. DET.	PLANT GEO. MEAN	GLOBAL GEO. MEAN	PLANT SPREAD FACTOR	GLOBAL SPREAD FACTOR	GLOBAL % PREV.
CONVENTIONALS																
COD	CHEMICAL OXYGEN DEMAND	mg/kg	0	1135831.38	1135831.38	1	1	100.0	36	36	100.0	1135831.38	508097.94	0.00	4.65	100.0
NNHTPR	AMMONIUM,TOTAL FIL.T.REAC.	mg/kg	0	15807.96	15807.96	1	1	100.0	25	25	100.0	15807.96	17658.28	0.00	2.92	100.0
NNTKUR	NITROGEN-TOT-KJEL,UNF.TOT	mg/kg	0	40983.61	40983.61	1	1	100.0	49	49	100.0	40983.61	38494.12	0.00	1.77	100.0
PH	(-LOG(H+(CONCN))	mg/kg	0	7.13	7.13	1	1	100.0	47	47	100.0	7.13	7.17	0.00	1.09	100.0
PHNOL	PHENOLICS (4AAP)	mg/kg	0	84.31	84.31	1	1	100.0	49	41	83.7	84.31	43.05	0.00	3.14	87.9
RST	RESIDUE, TOTAL	mg/kg	0	42700.00	42700.00	1	1	100.0	50	50	100.0	42700.00	80434.06	0.00	3.23	100.0
RSTLOI	RESIDUE,TOT.LOSS ON IGNI.	mg/kg	0	22700.00	22700.00	1	1	100.0	50	50	100.0	22700.00	43379.33	0.00	3.19	100.0
METALS																
AGUT	SILVER,UNFIL.T.TOTAL.	mg/kg	0	28.10	28.10	1	1	100.0	44	44	100.0	28.10	37.78	0.00	2.33	100.0
ALUT	ALUMINUM,UNFIL.T.TOTAL.	mg/kg	0	81967.21	81967.21	1	1	100.0	50	50	100.0	81967.21	10715.94	0.00	2.82	100.0
ASUT	ARSENIC,UNFIL.T.TOTAL.	mg/kg	0	5.15	5.15	1	1	100.0	50	49	98.0	5.15	5.40	0.00	2.06	97.1
CDUT	CADMIUM,UNFIL.T.TOTAL.	mg/kg	0	175.64	175.64	1	1	100.0	45	41	91.1	175.64	10.47	0.00	3.98	90.3
COUT	COBALT,UNFIL.T.TOTAL.	mg/kg	0	3.75	3.75	1	1	100.0	39	32	82.1	3.75	9.14	0.00	2.75	85.7
CRUT	CHROMIUM,UNFIL.T.TOTAL.	mg/kg	0	304.45	304.45	1	1	100.0	50	50	100.0	304.45	333.06	0.00	3.59	100.0
CUUT	COPPER,UNFIL.T.TOTAL.	mg/kg	0	726.00	726.00	1	1	100.0	45	45	100.0	726.00	732.24	0.00	2.16	100.0
HGUT	MERCURY,UNFIL.T.TOTAL.	mg/kg	0	3.75	3.75	1	1	100.0	50	49	98.0	3.75	3.24	0.00	2.04	97.1
NIUT	NICKEL,UNFIL.T.TOTAL.	mg/kg	0	91.33	91.33	1	1	100.0	45	42	93.3	91.33	72.95	0.00	2.95	90.0
PBUT	LEAD,UNFIL.T.TOTAL.	mg/kg	0	161.59	161.59	1	1	100.0	50	49	98.0	161.59	196.62	0.00	2.46	97.1
SEUT	SELENIUM,UNFIL.T.TOTAL.	mg/kg	0	4.92	4.92	1	1	100.0	50	48	96.0	4.92	2.67	0.00	2.98	97.1
SRUT	STRONTIUM,UNFIL.T.TOTAL.	mg/kg	0	257.61	257.61	1	1	100.0	50	50	100.0	257.61	240.93	0.00	2.54	100.0
ZNUT	ZINC,UNFIL.T.TOTAL.	mg/kg	0	585.48	585.48	1	1	100.0	50	50	100.0	585.48	988.90	0.00	2.57	100.0
PESTICIDES,HERBICIDES,PCBS																
P1DIEL	DIELDRIN	ug/kg	2	7.00	7.00	1	1	100.0	50	15	30.0	7.00	6.50	0.00	3.51	38.2
P1PCBT	PCB, TOTAL	ug/kg	2	56.20	56.20	1	1	100.0	50	32	64.0	56.20	114.10	0.00	4.58	67.7
P1PPDE	PP-DDE	ug/kg	1	7.00	7.00	1	1	100.0	50	34	68.0	7.00	11.10	0.00	2.72	73.5
P245T	2,4,5-TRICHLORPHENOXYACETIC ACID	ug/kg	3	100.70	100.70	1	1	100.0	50	16	32.0	100.70	84.40	0.00	3.13	41.2
P24D	2,4-DICHLOROPHENOXYACETIC ACID	ug/kg	3	491.80	491.80	1	1	100.0	50	25	50.0	491.80	75.00	0.00	5.81	64.7
PSILV	SILVEX	ug/kg	3	79.60	79.60	1	1	100.0	50	18	36.0	79.60	92.70	0.00	2.94	44.1
X2124	1,2,4-TRICHLOROBENZENE	ug/kg	3	12.90	12.90	1	1	100.0	50	22	44.0	12.90	14.80	0.00	5.02	52.9